DOCUMENT RESUME

ED 134 820 08 CE 010 043

AUTHOR Havens, Cheryl C.
TITLE Articulation for Allied Health. Final Report. Omnibus Dissemination Project.
INSTITUTION Kentucky Research Coordinating Unit, Lexington.
SPONS AGENCY Office of Education (DHEW), Washington, D.C.
BUREAU NO 37-475-101-0
PUB DATE 76
NOTE 130p.

EDRS PRICE MF-$0.83 HC-$7.35 Plus Postage.
DESCRIPTORS *Articulation (Program); Career Ladders; Certification; Credits; *Curriculum Design; Degree Requirements; Educational Certificates; Health Occupations; *Health Occupations Education; *Medical Assistants; Medical Laboratory Assistants; Medical Technologists; *Models; Post Secondary Education; Secretaries; State Programs; State Universities; Vocational Education
IDENTIFIERS *Kentucky

ABSTRACT

There exists in health occupations education, two types of educational institutions. One type prepares students for a certificate, and the other for a degree. The objective of the Articulation Project for Allied Health was to establish and document a procedure by which students with technical certificates could receive college credit, recommending the most logical and educationally sound method of accomplishing credit transfer with minimal loss of credit. The methodology involved in the project was to assimilate accumulated data and recommendations and to conduct interviews with professionals involved in the various fields of study. The professions chosen for this study were (1) certified laboratory assistants, (2) radiologic technologists, (3) certified operating room technicians, and (4) certified respiratory therapy technicians. A fifth area, that of medical secretary/medical assistant, was also examined and though a model could not be developed, an assessment was made of the various degree and non-degree programs in Kentucky with regard to the development of a career ladder. The quality of instruction required for AMA (American Medical Association) national accreditation of programs was considered a basis for evaluation of vocational program essentials. Beyond determining program essentials, specific procedures by which credit could be awarded to graduates of vocational-technical health occupations programs was delineated in the project. (A description of major activities and summary of the program articulation models for the five professions are included in the report.) (HD)

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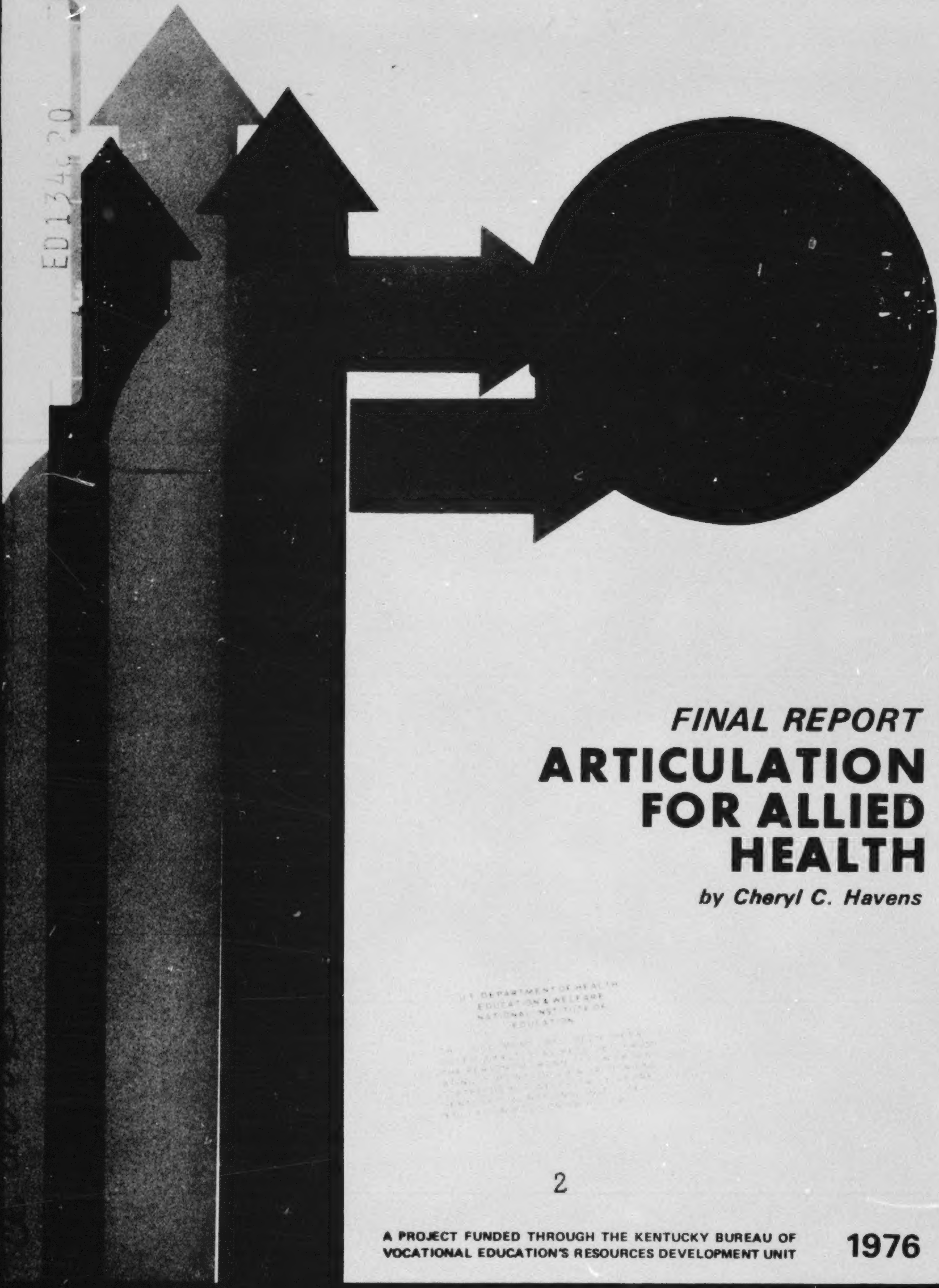

FINAL REPORT

ARTICULATION FOR ALLIED HEALTH

by Cheryl C. Havens

U.S. DEPARTMENT OF HEALTH
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

A PROJECT FUNDED THROUGH THE KENTUCKY BUREAU OF
VOCATIONAL EDUCATION'S RESOURCES DEVELOPMENT UNIT

1976

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AGREEMENT OF NONDISCRIMINATION

Title VI of the Civil Rights Act of 1964 states that no person in the United States shall, on the grounds of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subject to discrimination under any program or activity receiving Federal financial assistance. Therefore, the vocational education research, exemplary and dissemination program of the Commonwealth of Kentucky, like every program or activity receiving financial assistance from the Department of Health, Education and Welfare, must be operated in compliance with this law.

ABSTRACT AND SUMMARY
ARTICULATION PROJECT FOR ALLIED HEALTH

PROJECT NUMBER: 37-475-101-0

TITLE OF PROJECT: ARTICULATION PROJECT FOR ALLIED HEALTH

PROJECT DURATION: September 1, 1975 through August 31, 1976

ABSTRACT AND SUMMARY

ARTICULATION PROJECT FOR ALLIED HEALTH

Statement of Problem

There exists in health occupations education, two types of educational institutions. One type prepares students for a certificate, and the other for a degree. The dichotomy that exists is very evident when one attempts to migrate from one type of training to another. The lack of acceptance of "training" or "credit" is so restrictive that students literally start anew. This is a tragic situation for both the student and the taxpayer and an attempt has been made to solve the problem through the "Articulation Project for Allied Health."

Project Objective

The objective of the Articulation Project for Allied Health has been to establish and document a procedure by which students with technical certificates could receive college credit, recommending the most logical and educationally sound method of accomplishing credit transfer with minimal loss of credit.

Procedure

The methodology involved in the project has been to assimilate accumulated data and recommendations and to conduct interviews with professionals involved in the various fields of study. The professions chosen for this study were:

1. Certified Laboratory Assistants
2. Radiologic Technologists
3. Certified Operating Room Technicians
4. Certified Respiratory Therapy Technicians

A fifth area, that of the Medical Secretary/Medical Assistant, was also examined and though a model could not be developed, an assessment has been made of the various degree and non-degree programs in Kentucky with regard to the development of a career ladder.

The quality of instruction required for A.M.A. national accreditation of programs was considered a basis for evaluation of vocational program essentials. Beyond determining program essentials, specific procedures by which credit could be awarded to graduates of vocational-technical health occupations programs have been delineated in the project.

Description of Major Activities

A brief description and summary of the five professions discussed in the Articulation Project are outlined below:

1. Articulation of the Certified Laboratory Assistant (C.L.A.) from an A.S.C.P. approved training program to the university setting is seen as very viable with a transfer of 17 hours of academic credit recommended. Murray State University is presently in the final

stages of approving this option, and articulation appears feasible for other State universities in Kentucky.

2. A career ladder already has been developed in the Radiologic Technology profession as Western Kentucky University and University of Kentucky now grant 32-36 credit hours to the Registered Radiologic Technician to be applied to an Associate of Science Degree which is offered by each institution. The model is similar to what is now operating at these universities and requires that the student must have passed the certification examination given by the American Registry of Radiologic Technology prior to obtaining their associate degree.

3. Articulation for the Certified Operating Room Technician was discussed with persons in the field, and it was determined that the career ladder with the associate degree R.N. programs is most desirable and could be implemented through existing challenge mechanisms operating in associate degree nursing programs. The Certified Operating Room Technician can also receive further technical training in more specific operating room procedure if he or she is qualified. This route was chosen as opposed to the establishment of associate degrees for Operating Room Technicians because it has been the experience nationwide that associate degree C.O.R.T. programs have not been satisfactory as they have failed to offer the Operating Room Technician realistic channels for advancement.

4. Information on the feasibility of articulation for Certified Respiratory Therapy Technicians was gathered through interviews with the Madisonville faculty, with members of the State Respiration Therapy Board of Directors, and faculty of other programs in Kentucky and the United States. It was found that the national professional organization has not decided what its position is on the laddering of the C.R.T.T. to the Registered Therapist. Secondly, no mechanisms for facilitating credit transfer are operating in Kentucky, and directors of two Respiratory Therapist programs have differing views on the philosophy of such a concept. Based on these findings, it was concluded that no model could be developed prior to the professional organization's decision of whether or not to encourage linkages.

5. From an assessment of medical assisting programs in Kentucky, it was found that of the thirteen programs in the State, only four are accredited by the American Association of Medical Assistants – all of which are "clinical" medical assisting programs. The remaining nine are "administrative" medical assisting (medical secretary) programs and vary significantly in the length of the program and the course of study. In some cases, channels presently exist whereby students are permitted to challenge course work, although in the past there has not been a strong demand for articulation from diploma to Associate Degree programs. Ladder mechanisms are better defined from the associate to the baccalaureate level, for even though no four-year degree exists in the medical assisting field, students are eligible to enter related fields of Health Science or Secretarial Science. It is recommended that the levels of articulation in Medical Assisting be better defined within the State University system and that policies be made on seeking accreditation by the American Association of Medical Assisting for all community college and vocational programs. Linkages between the certificate or Associate Degree and the Bachelors Degree level also need to be refined in universities throughout the State system.

Dissemination Activities

As each of the sections of the model were completed, a preliminary draft of each was forwarded to persons associated with its preparation for their review and comments. In turn, their responses were incorporated into the final report. Dissemination of the models will be conducted by the Bureau of Vocational Education and the Health Science Advisory Committee's Allied Health Consortium which is composed of representatives from various allied health professions and universities. This consortium has agreed to be the framework through which the models can be disseminated to universities and vocational education programs and implemented wherever possible.

INTRODUCTION

ARTICULATION PROJECT FOR ALLIED HEALTH

INTRODUCTION

ARTICULATION PROJECT FOR ALLIED HEALTH

Numerous innovative educational opportunities have been developed or expanded within the past decade. This is particularly the case in the area of vocational-technical occupational education provided to Kentucky's post secondary school population. However, such growth has created new problems and demands on the overall educational enterprise of the state. At present, no formal network has been developed which would enable students to pursue continued education at different educational levels without interruption, delay, or loss of credit for previous training.

Directed towards the problem of the lack of career mobility, the "Articulation Project for Allied Health" was initiated to discover if articulation can be accomplished from a vocational program to the higher degree level. The model is designed to deal generally with vocational health occupations, specifically with the Certified Laboratory Assistant, Radiologic Technologist, Certified Operating Room Technician, Certified Respiratory Therapy Technician, and briefly with the Medical Secretary/Administrative Medical Assistant.

More definitively, articulation can be interpreted to mean either sequential curriculum, transferable credits or both in order to provide for the development of a career ladder. The Career Ladder provides opportunity for the entry level individual and/or trained worker to continue his or her education to a more advanced level in an occupational field, facilitating career development. Thus, the career ladder is suggested, where possible, based on various combinations of education and training, in order that one might progress from one occupational level to the next higher, depending on new skills and education acquired.

ACTIVITIES AND ACCOMPLISHMENTS
THE MODELS
ARTICULATION PROJECT FOR ALLIED HEALTH

SECTION I ARTICULATION FOR CLINICAL LABORATORY PROGRAMS

SECTION II ARTICULATION FOR RADIOLOGIC TECHNOLOGY PROGRAMS

SECTION III ARTICULATION FOR OPERATING ROOM TECHNOLOGY PROGRAMS

SECTION IV ARTICULATION FOR RESPIRATORY THERAPY TECHNOLOGY PROGRAMS

SECTION V ASSESSMENT OF MEDICAL ASSISTING PROGRAMS

Chapter 1

INTRODUCTION

ARTICULATION FOR CLINICAL LABORATORY PROGRAMS

There are several needs associated with the establishment of a career ladder. Primarily there is a need to provide direct channels of advancement from one level of training to the next, ending the "dead endedness" of the present CLA profession and allowing persons to change their occupational goals without being handicapped by institutional demands for repetition in training. Secondly, with the new demands and methods developing in the laboratory, it becomes essential to have more persons with advanced practical and academic training. By providing career mobility more persons would be given the incentive to seek higher skills and knowledge.

The first need seems to be self evident, and therefore, no further discusion of it is deemed necessary. The importance of the second need has been documented in the American Society of Clinical Pathologists Presidential Address which emphasizes the need for more efficiently operated laboratories.

> The need for the career ladder in the clinical laboratory has grown in significance as the quantity, quality, and variety of medical laboratory services broaden. That need will become much greater as the laboratories continue to broaden their services, as large regional laboratories develop, as the physician shortage becomes more acute.[1]

Definition of the Problem

This model is concerned with the development of only the first "rungs" of a career ladder and affects the articulation of the Certified Laboratory Assistant (CLA), to the Medical Laboratory Technician (MLT), or the Medical Technologist (MT), or an unrelated post secondary program culminating in an associate or baccalaureate degree, i.e., Biology or Chemistry.

The problem of credit transfer from one level to the next is based on many variables. Traditionally, colleges and universities have shied away from credit transfer from a vocational setting based on the belief that there was little similarity in the quality of education between the two. This may or may not have been the case at the onset of vocational-technical training in Kentucky, but it is assumed to be in no way true in the area of health occupations, an assumption which shall be sufficiently documented in this text.

Essentially, the MLT and MT programs referred to previously are higher degree programs training the Medical Laboratory technician and the Technologist. These programs are two and four-year programs, respectively, meeting degree as well as certification requirements. A description of these positions is essential in gaining an understanding of the development of the ladder concept. At present, the CLA cannot go directly into the Medical Technology (MT) program without repetition of courses and technical training. On the other hand, the MLT may or may not be eligible to pursue the MT degree at the baccalaureate level without delay or loss of credit. The CLA program is the starting point from which a ladder in health curriculums is developed. A more detailed description of the skills and responsibilities in each profession is described in Table I-1.

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[1] "Laboratory Medicine: Careers and Challenge." Thomas M. Perry, M.D. *Laboratory Medicine*, January 1970, p. 33. In addition, *Newsweek* magazine recently reported the present inefficiencies in the clinical laboratories. (September, 1975).

Methodology

The method used in the development of this project includes an accurate survey of the existing vocational curriculum, level of instruction, objectives of courses offered, and the laboratory equipment used. From this survey a determination will be made as to whether articulation can be accomplished. If feasible, the proposal will then be designed in the following manner:

1. Develop the criteria necessary to articulate from the vocational program to college level (establish and document a procedure by which students can receive college credit),

2. Recommend the most logical and educationally sound method of accomplishing credit transfer,

3. Define means of evaluating the success of the model.

For the purpose of this project, attention is limited only to the program taught in the Health Occupations Annex of the Madisonville State Vocational-Technical School and the corresponding courses at Murray State University. However, the model will be prepared in order to have applicability to similar vocational programs throughout the Commonwealth of Kentucky as well as state universities.

Finally, the alternatives which need to be made available to students coming into the college setting from vocational schools must remain open ended, permitting them to redirect their efforts in an alternative field. The model shall be developed in a manner in which the integrity of both programs is maintained and in a way which offers maximum opportunity to students.

TABLE 1-1

SKILLS AND RESPONSIBILITIES

CERTIFIED LABORATORY ASSISTANT	MEDICAL LABORATORY TECHNICIAN	MEDICAL TECHNOLOGIST
1. The CLA has a high school education or equivalent plus clinical experience in a structured program approved by the ASCP Board of Schools.	1. Has earned an associate's degree or equivalent and has training in basic procedures employed in the clinical laboratory.	1. Has earned a Bachelor's degree and had extensive in-depth training in clinical procedures employed in all laboratory sections.
2. Works under direct supervision of a qualified physician or M.T. (ASCP)	2. Works under supervision for the most part but may be able to work without direct supervision at times.	2. Is able to detect and correct errors, set up new procedures, develop quality control programs and supervise assistants.
3. Performs routine analysis in urinanalysis, hematology, biochemistry, microbiology, blood bank and serology.	3. Is able to recognize errors and problems but may not necessarily be able to correct them.	3. May be involved in teaching, curriculum-planning and supervision of CLA and MLT programs.
4. Training is primarily in manipulative skills in specimen collection and preparation, basic procedural techniques and principles of quality control.	4. May assume duties of evening and night shift supervisor in areas where procedures are routine and experience has been gained in simple troubleshooting and decision making.	

Chapter 2

GENERAL DESCRIPTION OF MADISONVILLE PROGRAM ARTICULATION FOR CLINICAL LABORATORY PROGRAMS

The CLA program offered at the Madisonville State Vocational-Technical School Health Occupations Annex is operated under the direction of Dr. E. E. Kawas, Pathologist of Hopkins County Hospital and Trover Clinic. The program is nationally accredited based on the professional criteria established by the Council of Medical Education of the American Medical Association, in collaboration with the American Society of Clinical Pathologists and the American Society of Medical Technology. In the approval notification, the Madisonville CLA program was noted as "an outstanding program with superior teaching aids," by American Medical Association representative Ralph W. Kuhli.[1]

The survey team's on-site inspection of the program brought forth the following response:[2]

> The program is apparently generously supported by the State of Kentucky. I saw a lavish display of teaching aids including a dozen slide projectors, audio-visual devices, a Sony video tape and innumerable color slides, etc. In the student laboratory, we saw a replica of a laboratory of a small hospital with Hycel cuvette chemistries, blood cells counted manually and simple spectrophotometers. There were also plastic models of arms for teaching venapuncture. In the laboratory of the hospital, on the other hand, I saw a student being shown identification of acid fast bacilli by flourescent microscopy, while in another room, two students were busy with their written tests. I saw a very keen interest in the program by the Director-Pathologist, his associates and his teaching staff, including the Director of the Vocational School. This is an outstanding program. My only recommendation would be to consider upgrading it to an MLT or MT level for which the facilities and personnel would be eminently qualified.

The American Society of Clinical Pathologists, and other accrediting agencies cited previously, have established "essential" requirements for all approved laboratory programs. These "essentials" include admissions requirements, faculty, curriculum, and classroom and clinical facilities available for the CLA program. Essential requirements, in regard to the Madisonville school, are all met satisfactorily as reflected by its accreditation. Nevertheless, these essentials are discussed in the narrative which follows as they are carried out at the Madisonville facility in order to substantiate the quality of training conducted by approved programs.

Organization

The Madisonville CLA program offers both academic (pre-clinical) and clinical training. All training of laboratory assistants is under competent supervision in both phases of the program. The program is affiliated with both the Trover Clinic and Hopkins County

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[1] See Attachment 1.

[2] Surveyor's comments, Dr. Cymbala, Board of Schools Accreditation, 1974.

Hospital which provide clinical laboratory training. Written agreements regarding affiliations are found as Attachment 2.

The school is approved for 12 students and normally has a 10-12 student enrollment each year. Records are kept of the students' high school transcripts, and work completed at the vocational center including student attendance and grades.

Admissions

Admission to the CLA program is based on graduation from an accredited high school and a personal interview with the admissions committee. The committee consists of the Medical Laboratory Director, Education Coordinator, Assistant Education Coordinator and Coordinator of Health Occupations Annex of the Madisonville State Vocational-Technical School.

Faculty

The CLA program operates under the direction of Dr. E. E. Kawas, certified in Clinical Pathology, who gives 10-12 formal lectures in the course of the 12-month CLA training. The Director is knowledgeable about the operation of the program and reviews reports of the student's progress submitted by the Education Coordinator. The Education Coordinator of the program is an ASCP Certified Medical Technologist with four years teaching experience. Duties involve the coordination of the pre-clinical and clinical aspects of the student program and include daily informal teaching sessions with students. Personnel vitaes of the Director, Education Coordinator and thirteen additional associate faculty are submitted as Attachment III. The school is considered to have a more than competent teaching staff with a low student-to-faculty ratio and individualized instruction.

Curriculum

Curriculum for the 12 month CLA program consists of 524 hours of didactic work and 1420 hours of supervised laboratory training. A description of the general education and advanced laboratory courses required for completion of the program is outlined in Table I-2.

TABLE I-2

COURSE OUTLINE

CERTIFIED LABORATORY ASSISTANTS

I. PRE-CLINICAL PHASE

I. Introduction . . . . 40 Hrs.

- A. Basic Terminology
- B. Instrumentation
- C. Glassware Used
- D. Care and Use of the Microscope

II. Basic Mathematics . . . . 52 1/2 Hrs.

- A. Handling Numbers
- B. Logarithms
- C. Conversion Problems
- D. Molarity & Normality

III. Basic Chemistry . . . . 49 1/2 Hrs.

- A. Atomic Weights
- B. Electrovalences
- C. Quality Control
- D. Acid-Base Solutions

IV. Anatomy & Physiology . . . . 20 Hrs.

- A. Nervous System
- B. Skeletal System
- C. Muscular System
- D. Circulatory System

V. Hematology . . . . 106 Hrs.

- A. Blood Formation
- B. Hemoglobin
- C. White Blood Cells & Red Blood Cells
- D. Coagulation
- E. Hematocrit & Sedimentation Rate

VI. Immunohematology . . . . 17 1/2 Hrs.

- A. ABO & Rh Blood Typing
- B. Direct & Indirect Coombs
- C. Compatability Testing
- D. Antibody Screening

VII. Serology . . . . 34 Hrs.

- A. Auto-immune mechanism
- B. Naturally Occuring Antibodies
- C. Study of VDRL
- D. Types of Tests Done for Syphillis

VIII. Bacteriology . . . . 10 1/2 Hrs.

- A. Cultures
- B. Specimen Inoculation
- C. Media
- D. Classification of Bacteria
- E. Differential Stains

IX. Introduction to Laboratory Procedures . . . . 56 Hrs.

- A. Making Stock Reagents
- B. Practice with Balance Beam
- C. Working with Instruments
- D. Standardization and Titrations

X. Urinalysis . . . . 17 Hrs.

- A. Basic Urine Chemistry
- B. Proteins & Sugars
- C. Urobilinogen & Porphryins
- D. Microscopic

XI. Chemistry Techniques . . . . 34 Hrs.

- A. Standardization of Curves
- B. Basic Procedures
- C. Troubleshooting

XII. Technique of Venipuncture . . . . 87 Hrs.

- A. Approach to Patient
- B. Equipment Used
- C. Handling Specimen
- D. Practice Venipuncture

II. CLINICAL PHASE

I. Hematology . . . . 315 Hrs.

- A. Donor Room
- B. Hematology Rotation

II. Clinical Chemistry . . . . 360 Hrs.

A. Special Chemistry
B. General Bench Work
C. Enzyme Bench Work
D. Auto Analyzer
E. (ACA) Automatic Chemical Analyzer

III. Bacteriology . . . . 250 Hrs.

A. Make Media
B. Plant Cultures
C. Digest TB Cultures
D. Do Gram Stains

IV. Clinical Immunohematology . . . . 235 Hrs.

A. Processing New Blood
B. Draw Donors
C. ABO & Rh typing
D. Compatability Testing
E. Antibody Screening

V. Clinical Serology . . . . 105 Hrs.

A. VDRL's (quan. & qual.)
B. ASLO's & CRP
C. RA Test and Titer
D. Febrile Agglutination
E. Mono-test, Heterophil, Davidsohn Differential

VI. Clinical Urinalysis . . . . 130 Hrs.

A. Patient Urines
B. Microscopics
C. Bence-Jones Proteins
D. Glucose Tolerances
E. Urobilinogen
F. Porphyrins
G. Pregnancy Tests

VII. Special Topics . . . . 25 Hrs.

A. Cytology
B. Audio-Visual Aids
C. Filmstrips
D. Kodachromes
E. Transparencies

Textbooks used in the program include:

Basic Laboratory Techniques for Medical Laboratory Technician, Linne and Ringstrud, McGraw-Hill Book Co., Blakiston Division, St. Louis.

Clinical Chemistry Principles and Procedures, Joseph S. Annino, 3rd Ed. Little, Brown and Co., Boston, Mass.

Dorland's Pocket Medical Dictionary, 21st Ed. W. B. Saunders Co., Philadelphia, Pa.

Hematology for Medical Technologist, Charles E. Seiverd, 4th Ed. Lea & Febiger, Washington Square, Philadelphia, Pa.

Principles of Microbiology, Alice Lorraine Smith, 7th Ed., C. V. Mosby Co., St. Louis, Mo.

Textbook of Anatomy and Physiology, Catherine P. Anthony and Norma Jane Kolthoff, 8th Ed., Mosby Publications.

Course Objectives

The course objectives are generally designed to provide the student with an integrated background on all aspects relating to the medical laboratory as well as to provide specific knowledge in medical laboratory technique. For specific objectives describing individual courses, see Attachment IV. The course descriptions and objectives should indicate the amount of material mastered and the level of achievement that the students attain after satisfactorily completing the course complement. Students are given weekly examinations in their courses testing their ability to recall, interpret, and solve problems. A grade of 70 or below is considered unsatisfactory.

Classroom and Laboratory Facilities

The modern classroom and laboratory are more than adequate, allowing for spacious facilities for performance of service and teaching functions. The student hospital and clinical laboratories include approximately 900 square feet and the following equipment:

Laboratory Equipment:

Microscopes
ACA (2)
Coulter Model S (2)
Coulter Model F (2)
Auto Analyzer, dual channel
Electra 500
Fibrometer
Spectronic 100
Corning Blood Gas Analyzer
Corning Chloride Titrator
Buchler Chloridometer (2)
IL Blood Gas Analyzer
IL Co-Oximeter
IL Flame Photometers (3)
Auto-Technicon
Dade Cell Washer
IEC Refrigerated Centrifuge
Jewett Blood Bank refrigerated (2)
Digiscreen C.

In addition to a large medical library available for student use, extensive audiovisual equipment is available to the program as well as teaching and demonstration materials used for instructional purposes. A list of these materials and the journals and textbooks available in the immediate laboratory area is found below.

Audiovisual Equipment:

Slide Projectors
Tape Players and Recorders
Opaque Projector
Overhead Projector
Video-Tape Player and Recorder
Duplicator for Preparing Transparencies
Singer Rear Screen Projector with Cassette Player and Recorder.

Reference Material (HCH Lab.)

Urine and the Urinary Sediment; Lippman, 2nd ed.

Todd-Sanford Clinical Diagnosis by Laboratory Methods; Davidsohn & Henry, 14th ed.

Manual of Clinical Laboratory Methods; Hepler, 4th ed.

Blood Coagulation Simplified; Nour-Eldin, 2nd ed.

Manual of Tests for Syphilis; U.S. Dept. H. E. W., 1969.

Immunology and Serology; Carpenter, 2nd ed.

Technical Methods and Procedures of Am. Assoc. of Blood Banks; 5th ed.

Standards for Blood Banks and Transfusion Services; AABB, 5th ed.

Immunohematology: Principles and Practice; Ortho Diagnostics.

Clinical Chemistry Principles and Techniques; Henry.

Medical Laboratory Technology and Clinical Pathology; Lynch et al; 2nd ed.

The Merck Index; 7th ed.

Manual of Clinical Microbiology; Blair et al, 1970.

Diagnostic Microbiology; Bailey & Scott, 3rd ed.

Atlas of Diagnostic Microbiology; Schneierson.

Color Atlas of Intestinal Parasites; Spencer & Monroe.

Medical Parasitology; Swartz, 2nd ed.

Bergey's Manual of Determinative Bacteriology; 7th ed.

Handbook of Microbiology; Jacobs & Gerstein.

Bacterial and Mycotic Infections of Man; Dubos & Hirsch.

Gradwohl's Laboratory Diagnosis; Vol. I & II, 7th ed.

Listen, Look & Learn Series; ASCP, 1973: Chemistry, Serology, Microbiology, Coagulation & Blood Banking

The Morphology of Human Blood Cells by L.W. Diggs, Dorothy Sturm and Ann Bell.

Laboratory Medicine Hematology by John Mialc.

Hematology for Medical Technologists by Charles Seiverd

Clinical Diagnosis by Laboratory Examination by John A. Kolmer

Clinical Laboratory Methods by W.E. Bray.

Certification

Graduates of Madisonville CLA program and all approved programs are eligible for the National Certification Examination given by the Board of Registry of the American Society of Clinical Pathologists.

Graduate Placement

Graduates from the Madisonville program have traditionally taken several occupational routes – generally entering into laboratory work upon certification. Yet occasionally, the students have not begun working immediately in the laboratory going instead into a different profession or homemaking. A surprisingly large number, however, have returned to school in order to further their education, either in the laboratory field or in an unrelated occupational area. In the last year's class (1974), 2 out of 9 graduates are enrolled in college and an additional graduate is planning to proceed in a similar manner.

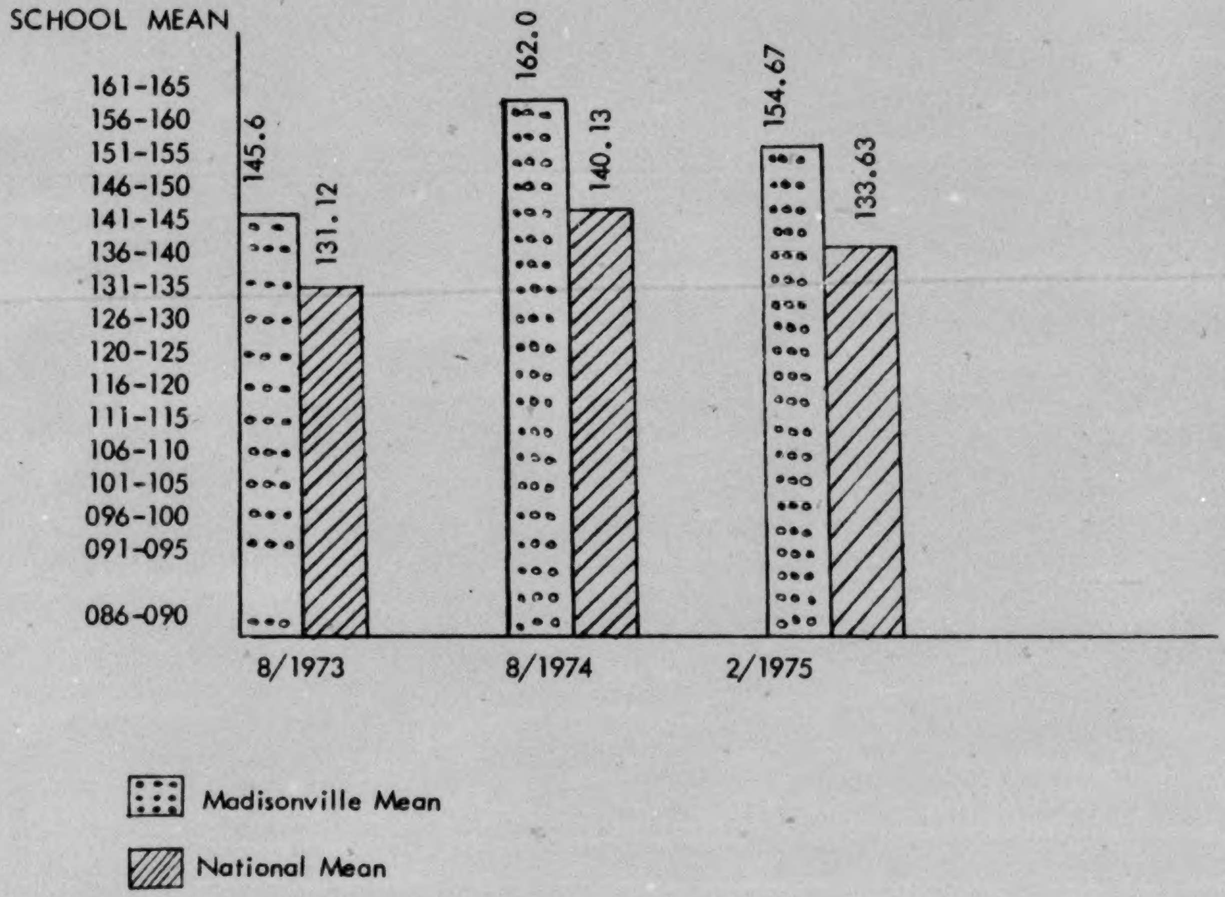
Summary

The philosophy of the CLA program is to produce high quality, well-trained laboratory workers to maintain high standards of practice to meet our growing needs and the needs of surrounding hospitals. Since the American Medical Association has approved the program involved in the project, the quality of education should not be of major concern. Yet it is noteworthy that the school far surpasses the general American Medical Association curriculum and faculty requirements. A measure of this general effectiveness can be made in comparing Madisonville's mean scores on the Registry Certification Examination with other nationally accredited schools. This comparison is illustrated graphically in Table I-3.

Based on the general requirements offered by Madisonville's CLA program, their accredited status and their student standing compared to national means, it is believed that the Madisonville CLA program is a quality program with capable staff and clinical facilities. The curriculum is in many ways the same as courses offered at Murray State University covering similar material and entailing comparable class lecture and laboratory hours. From discussions with both Vocational and University educators it was determined that articulation was indeed possible. The methods by which credit transfer could be achieved are forthcoming.

TABLE 1-3

COMPARISON OF CERTIFICATION EXAM SCORES
BETWEEN MADISONVILLE AND NATIONAL MEAN SCORES
1973-1975



Chapter 3

THE MODEL AND AFFINITY WITH MURRAY STATE UNIVERSITY ARTICULATION FOR CLINICAL LABORATORY PROGRAMS

There are various alternatives available in facilitating the receipt of college credit for vocational education. The implementation of a challenge examination prepared by the education coordinator of the vocational program or college instructor is one alternative demonstrating the student's proficiency in mastering course material. The use of C.L.E.P. examinations in areas directly applicable to Biology and Chemistry courses taken in the CLA curriculum is also possible. C.L.E.P. examinations are offered in various areas such as Biology, Clinical Chemistry, General Chemistry, Hematology, Immunohematology, and Microbiology. Other means of evaluation include a professional examination for clinical laboratory personnel prepared by the Educational Testing Service; however, this exam is still in the stages of being tested and modified. In situations where the CLA program was not accredited and where the student had not passed a certification exam, the application of these means of evaluation are certainly viable options.

However, in the case of the Madisonville program and other approved programs, the following criteria were found to be sufficient:

1. Transcripts forwarded to the University from Madisonville indicating satisfactory graduation from an AMA approved CLA program
2. Certification by the Board of Registry A.S.C.P.
3. Official enrollment in the University from which credit is granted.

The rationale from which this reasoning is based stems primarily from the fact that the student would be tested on material that he or she had already proven mastery of via the certification examination. The material, i.e., curriculum due to the accredited status of the Madisonville program is assumed to meet certain levels of difficulty. The Madisonville curriculum was broken down to corresponding courses offered at Murray State in order that specific credit hours could be designated rather than general elective credit (see next page). These course designations are believed to be applicable in any State University, as well, and students from the Madisonville CLA program, or its equivalent should have no difficulty moving to courses with higher levels of difficulty based on their previous training. Based on curriculum and course objectives outlined in the previous chapter, and a review of the texts and other course material, the following course equivalencies and credit were found appropriate as seen in Table I-4.

These science courses fulfill the students' math and science general education requirements for a Bachelor of Arts degree and are applicable to Bachelor of Science degree requirements. In this way, the student is given immediate flexibility in the choice of a field of study. Credits may be applied to an unrelated area or a related laboratory area depending on the student's desires. In the case of Murray State University, which offers a Medical Technology degree as an advanced laboratory science, the CLA has met a considerable number of the introductory science requirements.

TABLE 1-4

COURSE EQUIVALENCIES AND CREDIT RECOMMENDATIONS

Madisonville Course Name	Lecture Hours	Clinical Lab Hours	Murray Credit Hours	Murray Course Equivalent
Introduction	40.0		No credit[1]	
Trover Clinic		315.0		
Special Topics		25.0		
Techniques of Veni Puncture	87.0			N/A
Intro. to Lab. Procedures	56.0	360.0		
Basic Math	52.5			
Basic Chemistry	49.5		5	General College Chem. 121
Chemistry Techniques	34.0			
Anatomy & Physiology	20.0			Human BIO. 103
Hematology	106.0		8	Human Anatomy & Physiology I BIO 238
Urinalysis	17.0	130.0		
Immunohematology	17.5	235.0		
Serology	34.0	105.0		
Bacteriology	10.5	250.0	4	Intro. Microbio. BIO 426 — Must audit lecture
TOTAL	524.0	1420.0	17	

---

[1] Apply to all courses. No specific equivalent or credit offered.

Another option available to the CLA is to obtain an associate degree or equivalent from an accredited institution, including courses in Chemistry and Biology and to then apply for the Board of Registry MLT certification examination. As of August 1976, six semester hours of Chemistry with laboratory and six semester hours of Biology with laboratory will be required to supplement academic work. Thus, a CLA student could enter the MLT program if offered at the University, or take the equivalent hours for an associate degree to be eligible for certification.

Though Murray State does not have an associate degree Medical Laboratory Technician program, the College of Environmental Sciences is developing this associate degree medical laboratory science program to supplement its Medical Technology baccalaureate program. This MLT program, once approved, would provide a crucial step in the career ladder, permitting the CLA to progress to the MLT based on one additional year of academic credit. Like the CLA, the MLT with an associate degree or its equivalent is eligible to plug into the Medical Technology program at Murray State University.

In order to better visualize the laboratory science career ladder, the proposed MLT curriculum and the present MT curriculum are outlined in Tables I-5 and I-6.

TABLE 1-5

TENTATIVE – ASSOCIATE DEGREE FOR MEDICAL LABORATORY TECHNOLOGY

First Semester		Second Semester	
ENG 101, Composition	3.0	ENG 102, Composition	3.0
CHE 121, General College or CHE 105	5.0	CHE 122, General College or CHE 106	5.0
MAT 110, Alg and Trig	5.0	BIO 238, Anat and Phy	4.0
BIO 103, Human Bio	4.0	MAT 300, Statistics	3.0
	17.0	Elective	3.0
			18.0

Third Semester		Fourth Semester	
BIO 426, Microbiology	4.0	BIO 590, Pathogeneic Micro	4.0
ENG 201, Intro. to Lit	3.0	CHE 301, Instrumental Anal	3.0
CHE 300, Quant. Anal.	4.0	CHE 509 & 510, Organic Chem. and Lab	4.0
M.L.T., 100	3.0	Elective	3.0
Elective	3.0	M.L.T. 101	4.0
	17.0		18.0

MLT 102 Summer Practicum – 9 hours

TABLE 1-6

PRE-MEDICAL TECHNOLOGY CURRICULUM

First Semester	
ENG 101, Composition	3.0
CHE 121, General College	5.0
MAT 110, Alg and Trig	5.0
FRO 099, Orientation	1.0
BIO 103, Human Bio	4.0
	18.0

Second Semester	
ENG 102, Composition	3.0
CHE 122, General College	5.0
BIO 202, Zoology	4.0
*Elective (Social Sciences)	3.0
**Elective (Communications or Humanities)	3.0
	18.0

Third Semester	
ENG 201, Intro. to Lit.	3.0
PSY 180, General	3.0
CHE 300, Quantitative	4.0
*Elective (Social Sciences)	3.0
Elective	3.0
	18.0

Fourth Semester	
MAT 300, Statistics	3.0
BIO 238, Anat and Phy	4.0
CHE 301, Instrumental Analysis	3.0
*Elective (Social Science)	3.0
**Elective (Humanities)	3.0
	16.0

Fifth Semester	
PHY 120, General	4.0
BIO 550, Cell Phys or BIO 508, Histology	4.0
CHE 509, Organic and 510	4.0
BIO 426, Micro Bio	4.0
**Elective (Humanities)	3.0
	19.0

Sixth Semester	
PHY 121, General	4.0
BIO 425, Genetics	4.0
CHE 521, Biochemistry	3.0
BIO 590, Pathogeneic Micro	4.0
*Elective (Social Sciences)	3.0
	18.0

*Social Sciences – A total of 12 hours may be selected in the Social Sciences; no more than two courses in any one category: (1) Economics, (2) Geography, (3) Political Science, (4) Sociology/Anthropology (Cultural), (5) History

**Communications and Humanities – Nine hours are to be selected from any two of the following fields: (1) English (in addition to 101, 102, 201) (2) Journalism, (3) Speech, (4) Radio-Television

The above is a suggested curriculum and may be changed to meet the needs of the individual student under the supervision of the Medical Technology Advisor. Students must be accepted to a clinical Medical Technology program for the final year of training.

Chapter 4

EVALUATION AND DISSEMINATION

ARTICULATION FOR CLINICAL LABORATORY PROGRAMS

As emphasized in the previous sections, the model, or various alternatives, should have applicability throughout the Commonwealth of Kentucky. The course equivalents (for credit transfer) are basic courses undoubtedly offered at all four-year colleges and many community colleges in the State. The philosophy for giving credit for credit earned is sound and the concept of the career ladder is essential to planning for health professions. In order for the model to be utilized by both vocational schools and the universities, it must be relayed to these institutions, registrars, and perspective students. In addition, the CLA presently working in the hospital laboratory or clinic may or may not be aware of the opportunities of advancement to MLT certification via the associate degree (or equivalent) route. Thus, the person in the laboratory field should also receive information on this "Articulation Project," once it is in effect.

The plan for dissemination of the model by the Bureau of Vocational Education to the State universities should include: 1) an explanation of the purpose of the project; 2) the model of credit transfer established in this proposal, i.e., course equivalents; and 3) an explanation of the ladder concept as applied to the clinical laboratory sciences. Once it is established that the university or institution will implement the model or an alternative, students in vocational programs and hospital personnel should be notified of their local university's attempt to implement a system of credit transfer.

The process of evaluation based on the student's performance in the university setting is a tool to justifying or modifying the credit transfer. As two students from the Madisonville program are already enrolled at Murray State, the process of evaluation of the model is simplified considerably. These students' academic performance can be correlated to their performance at the Madisonville Health Occupation Center and their certification test scores in order to justify credit transfer and to determine if more rigid levels or standards of minimum acceptability need be established. These students have agreed to cooperate with an evaluation of the model and they are considered to be primary resources. It is also suspected that several other Madisonville students will be taking advantage of the credit transfer at Murray State, and these students should also have input into the implementation of an evaluation mechanism.

In addition, the model should be circulated to the associated professional societies for review and comment as well as disseminated to statewide universities and community colleges, as alluded to previously, for review and comment.

Summary

The model developed in the articulation of the CLA reflects flexibility in occupational progression and mobility based on educational background and prowess. The exemplary position taken in the development of strategies allows for instruments of credit assessment and transfer to be modified depending on the institutions involved. Specific criteria for credit transfer include:

1. Meet requirements for admission to the University including high school graduation and acceptable college entrance exam scores.

2. Forward a satisfactory transcript from approved vocational schools, graduation and certification.

It cannot be stressed enough that though this process of articulation is only an example of how the career ladder concept is applied to the laboratory sciences at Murray and Madisonville, the emphasis is upon making the model applicable statewide, to affect not only the student CLA, but also the clinician. The intent of the development of the model is to provide advanced channels for personal advancement as well as ultimately to provide higher quality in the clinical setting.

ATTACHMENT 1
Accreditation

AMERICAN MEDICAL ASSOCIATION
535 NORTH DEARBORN STREET • CHICAGO, ILLINOIS 60610 • PHONE (312) 751-6000 • TWX 910-221-0300

IL ON
AL EDUCATION

June 24, 1974

Dr. E. E. Kawas, Director
School for Certified Laboratory Assistants
Madisonville Area Vocational School
710 N. Laffoon
Madisonville, Kentucky 42431

Dear Dr. Kawas:

It is a pleasure to inform you that during its June 21-23 meeting, the AMA Council on Medical Education awarded *Approval* to the School for Certified Laboratory Assistants at the Madisonville Area Vocational School in Madisonville, Kentucky for a period of five years. This action was taken upon recommendation from the National Accrediting Agency for Clinical Laboratory Sciences which is composed of representatives from the American Society for Medical Technology and American Society of Clinical Pathologists.

This is an outstanding program with superior teaching aids. There is a very keen interest in the program by the director, his associates, and his teaching staff, including the director of the Vocational School.

You have our best wishes for the continued successful operation of the Certified Laboratory Assistant Program.

Sincerely,

Ralph Kuhli

Ralph C. Kuhli, MPH, Secretary
Advisory Committee on Education
for the Allied Health Professions
and Services

RCK:mah

cc: Colin R. Macpherson, M.D.
Mary Zeller, MT(ASCP)

ATTACHMENT 2
Clinical Affiliations

HOPKINS
COUNTY
Hospital, Inc.

MADISONVILLE, KENTUCKY - 42431 • PHONE (AREA CODE 502) 821-6430

July 15, 1971

Mr. Ray Dunn
Health Occupations Coordinator
Madisonville Area Vocational School
Madisonville, Kentucky 42431

Dear Mr. Dunn:

This is to inform you that we are happy to provide clinical laboratory training for your students in the Certified Laboratory Assistants Program.

Sincerely,

Richard A. Byrnes

Richard A. Byrnes
Administrator

RAB/rfs

cc: Dr. E.E. Kawas
Director, Clinical Laboratory

TROVER CLINIC
CLINIC DRIVE
MADISONVILLE, KENTUCKY
42431
TELEPHONE 821-7171

ADMINISTRATION
RAYMOND O. PEARCE
D. W. DOCAREY, JR.
T. W. CORUM, JR.

CLINICAL DIRECTOR
LOMAN C. TROVER, M.D.

PEDIATRICS
PAULL S. TROVER, M.D.
WALTER A. KIRCHNER, M.D.
ARTHUR T. HALL, M.D.
VIRGIL W. LOWE, M.D.
R. KEITH BACHMAN, M.D.

GENERAL SURGERY
MERLE M. MAHR, M.D.
WILLIAM C. GARDNER, M.D.
WILLIAM R. JERNIGAN, M.D.
J. L. MILBURN, M.D.
J. L. HAMMAN, M.D.
JOSEPH E. ROE, M.D.

NEUROSURGERY
MANUEL A. CACDAC, M.D.

PLASTIC SURGERY
LISLE WAYNE II, M.D.

UROLOGY
WILLIAM H. KLOMPUS, M.D.
HARRY O. DeSANDI, JR., M.D.

FAMILY PRACTICE
CHARLES R. FISHER, M.D.
KENNETH P. HAYWOOD, M.D.
PAUL H. TAYLOR, M.D.
FERRIS I. LARSEN, M.D.
ROBERT L. ROLD, M.D.

OPHTHALMOLOGY
JOHN W. PATE, M.D.
GERALD CLARK, M.D.
SIDNEY H. EDELSTEIN, O.D.

INTERNAL MEDICINE
FREDERICK J. SIGDA, M.D.
WALLACE R. ALEXANDER, M.D.
JAMES A. CLARKE, M.D.
C. WM. VAN HOOSER, M.D.
RALPH C. HINES, M.D.
CRIT HOBBS, M.D.
C. M. STEINFELD, M.D.
THOMAS A. GALLO, M.D.

ORTHOPAEDIC SURGERY
GEORGE E. AINSWORTH, M.D.
JON R. LOVE, II, M.D.
MD A. QUADER, M.D.

OBSTETRICS AND GYNECOLOGY
EUGENE A. CASTLE, M.D.
GEORGE E. DODSON, M.D.
JIM L. ROGERS, M.D.
RICHARD F. PLANT, M.D.

ANESTHESIOLOGY
JOHN E. HAYNES, M.D.
FREDERICK A. SCOTT, M.D.

RADIOLOGY
S. E. COFFMAN, JR. M.D.
C. WILLIAM ROGERS, M.D.
JAMES L. BECK, M.D.
JAMES F. ROLD, M.D.

THORACIC SURGERY
WILLIAM C. GARDNER, M.D.
J. L. HAMMAN, M.D.

PATHOLOGY
ELIAS E. KAWAS, M.D.
MAX KREMZAR, M.D.
SEUNG B. SOHN, M.D.
HARVEY L. KINCAID, JR., PH. D.

ORAL SURGERY
JOE W. JONES, JR., D.M.D.

NEUROPSYCHIATRY
ALAN G. JOHNSON, M.D.

COMMUNITY MEDICINE
DAN A. MARTIN M.D.
MARION E. ARNOLD, M.D.
FE CACDAC, M.D.

DERMATOLOGY
JAMES G. GULLEY, M.D.

OTOLARYNGOLOGY
ARCHIBALD F. SHULER, M.D.
MARIAN T. MORGAN, M.A.

PODIATRY
LAWRENCE J. DOWNS, D.P.M.

25 July 1971

Mr. Ray Dunn
Health Occupations Coordinator
Madisonville Area Vocation School
Madisonville, Kentucky 42431

Dear Mr. Dunn:

This is to inform you that we are happy to provide clinical laboratory training for your students in the Certified Laboratory Assistants Program.

We fully recognize the importance of this program in our own growth pattern as well as in the growth pattern of our entire medical community. You are to be commended on your efforts.

Sincerely,

Loman C Trover

Loman C. Trover, M.D.

LCT:lg

ATTACHMENT 3
Faculty Vitaes

FACULTY

1. MEDICAL DIRECTOR: ELIAS E. KAWAS, M.D.

June '53	M.D. New York University College of Medicine
Jan. '56-Dec.'59	Pathology Residency, Walter Reed Army Hospital
April '60	Certified in C. P. and P. A.
June '60-Sept. '62	Chief, Laboratory Service, USAH, Ft. Campbell, Ky.
Sept. '62-Dec. '63	Chief, Laboratory Service, Ireland Army Hospital, Ft. Knox, Ky.
Jan. '64-Present	Pathologist, Hopkins County Hospital and Trover Clinic

2. ASSOCIATE PATHOLOGIST: MAX KREMZAR, M.D.

1964	M.D. New York Medical College, New York City, N.Y.
1964-1965	Internship Bellevue Hospital, New York, N.Y.
1965-1968	Pathology Residency, Bellevue Hospital, New York, N.Y.
1969	Certified in C. P. and P. A.
1968-1971	Member of Staff, Armed Forces Institute of Pathology
1971-Present	Associate Pathologist, Hopkins County Hospital and Trover Clinic

3. CLINICAL BIOCHEMIST: HARVEY L. KINCAID, JR. Ph.D.

B.A. (1964)	Vanderbilt University, Nashville, Tenn.
B.A. (1965)	Texas Christian University
M.S. (1968)	Baylor University
Ph.D. (1971)	University of Texas
1967-1971	Robert A. Welch Fellowship in Biochemistry
1971-1973	Research Associate, University of Hawaii
1973-Present	Clinical Biochemist, Trover Clinic and Hopkins County Hospital

4. EDUCATION COORDINATOR: DONNA GILLAM HARRISON, B.S., MT(ASCP)

EDUCATION:

Suda B. Butler High School, Louisville, Kentucky	Graduated 1962
Murray State University, Murray, Kentucky	B.S. May '67
Norton Memorial Infirmary Med. Tech. School, Louisville, Ky.	July '65 - June '66
MT (ASCP) Certification	1966

EXPERIENCE:

July '66-Sept. '68	General Med. Tech., Fuller Morgan Hospital, Mayfield, Ky.
Sept. '68-June '71	General Med. Tech., and Assistant Education Coordinator, Trover Clinic, Madisonville, Ky.
July '71-Present	Education Coordinator

5. ASSISTANT EDUCATION COORDINATOR: CARRIE M. MILLER, B.S., MT(ASCP)

EDUCATION:

Louisiana State University	B. S., 1945
Street Clinic, Vicksburg, Mississippi	1966
MT (ASCP) Certification	1966

EXPERIENCE:

1966-1967	Jefferson Davis Memorial Hospital
1968	Supervisor of Chemistry, Crittendon Memorial Hospital, West Memphis, Arkansas
Dec.'68-June'71	Assistant Supervisor, Chemistry, Hopkins County Hospital
June'71-Present	Assistant Education Coordinator

6. ROBERT ESMON BIGGER, MT (ASCP): CHIEF TECHNOLOGIST, HOPKINS COUNTY HOSPITAL

COLLEGE:	Arkansas State University, Jonesboro, Ark. B.S. 1963; M.S. 1968
TECH. SCHOOL:	Methodist Hospital, Memphis, Tenn; 1968
REGISTRY:	MT (ASCP); 1963
EXPERIENCE:	Methodist Hospital, Memphis Tenn., Clinical Chemistry Supervisor; 1963-1966 Hopkins County Hospital, Madisonville, Ky., Chief Technologist; 1968-Present

7. BILL J. EATON, MT (ASCP) CHIEF TECHNOLOGIST, TROVER CLINIC

COLLEGE:	Cumberland Junior College, Williamsburg, Ky.; Sept.'54-June'56 University of Louisville, Louisville, Ky.; Sept.'56-Sept.'58; B.S. 1958
TECH. SCHOOL:	Kentucky Baptist Hospital, Louisville, Ky.; Sept'57-Sept'58
REGISTRY:	MT (ASCP); Nov.'58
EXPERIENCE:	Kentucky Baptist Hospital, Louisville, Ky., Med. Tech. (Hematology); June'57-Sept.'57 United States Army Hospital, Ft. Chaffee, Ark., Chief, Chemistry Section; Oct'61-July'62

Trover Clinic, Madisonville, Ky.; Sept.'58-Sept.'61
Aug. '62-Present

8. HUGH P. EARLE, SUPERVISOR, MICROBIOLOGY SECTION, HOPKINS COUNTY HOSPITAL

1938-1940	Worked in laboratory of Fulton Hospital while in High School.
1940-1942	Attended University of Kentucky. Worked part time in laboratories of Student Health Service and Department of Hygiene and Public Health.
1942-1946	U.S. Army Medical Department. Attended Medical Department Enlisted Technicians School, Billings General Hospital, Ft. Harrison, Ind. Assignment as instructor for a period of four months in Bacteriology and Parasitology. Was with the 71st Station Hospital in the South Pacific for a period of 31 months. General laboratory work and in charge of Bacteriology and Parasitology Section.
1947	Attended University of Kentucky. Worked part time in St. Joseph Hospital, Lexington, Ky., in Blood Bank and Bacteriology.
1948	Murray-Calloway County Hospital, Murray, Kentucky, General Lab.
1949	Houston-McDevitt Clinic, Murray, Kentucky. In charge of laboratory for twelve man clinic.
1950	Caldwell County War Memorial Hospital, Princeton, Ky. Set up and operated laboratory for a new forty bed hospital.
1951-Present	Hopkins County Hospital, Madisonville, Ky., Chief Technician until Fall, 1967. Supervisor of Microbiology thereafter.

9. BRENDA GAIL SCHUETTE, MT (ASCP): SECTION SUPERVISOR, HOPKINS COUNTY HOSPITAL

COLLEGE:	Murray State University, Murray, Kentucky	1961-1964 B.S. 1964
TECH. SCHOOL:	Deaconess Hospital, Evansville, Indiana	1964-1965
REGISTRY:	MT (ASCP)	1967
EXPERIENCE:	Hopkins County Hospital, Madisonville, Ky.	Sept. '65-1966
	State T.B. Hospital, Madisonville, Ky.	Jan. '67-Nov.'68
	Hopkins County Hospital, Madisonville, Ky.	Sept. '69-Present

10. BONNIE TEMPLETON, MT (ASCP): SECTION SUPERVISOR, HOPKINS COUNTY HOSPITAL

COLLEGE:	University of Kentucky, Lexington, Ky.	1967-1971 B.S. 1971
TECH. SCHOOL:	University of Kentucky Medical Center	1971
REGISTRY:	MT (ASCP)	1972
EXPERIENCE:	University of Kentucky Medical Center, Med. Tech.	Mar.'72-Sept.'72
	Hopkins County Hospital, Madisonville, Ky.	Sept.'72-Present

11. ROBERT O. BRODDLE, MT (ASCP): ASSISTANT CHIEF TECHNOLOGIST, TROVER CLINIC

COLLEGE:	University of Kansas, Lawrence, Kansas	July'65-July'68
	Washburn University, Topeka, Kansas	July'68-July'69 B.S. 1969
TECH. SCHOOL:	Lattimore-Fink School of Medical Technology, Topeka, Kansas	
	St. Francis Hospital School of Nuclear Medrical Technology, Wichita, Kansas	
REGISTRY:	Medical Technologist MT (ASCP)	July, 1969
	Registered Technologist Nuclear Medicine RT (ARRT)	Dec., 1970
	Nuclear Medical Technologist NM (ASCP)	Mar. 1971
EXPERIENCE:	Osteopathic Hospital, Wichita, Kansas, Tech.	July'69-July'70
	Deaconess Hospital, Evansville, Ind. Chem. Supervisor	June'70-Mar.'73
	Trover Clinic, Madisonville, Ky. Asst. Chief Tech.	Mar.'73-Present

12. SHERRY E. SCHAEFFER, MT (ASCP) SECTION SUPERVISOR, HOPKINS COUNTY HOSPITAL

COLLEGE:	Estherville Junior College, Estherville, Iowa	1960-1970
	University of Iowa, Iowa City, Iowa	1970-1973
TECH. SCHOOL:	University of Iowa Medical Tech. Program	1972-1973 B.S. 1973
REGISTRY:	MT (ASCP)	Aug.'73
EXPERIENCE:	Hopkins County Hospital, Madisonville, Ky.	July'73-Present

ORIENTATION OBJECTIVES

1. The student will adequately perform venipunctures and be able to describe the proper method for drawing blood.
2. The student will be familiar with the use of anticoagulants and be able to identify those most commonly used.
3. The student will recognize and properly use pipettes and other glassware.
4. The student will properly clean and store glassware.
5. The student will identify the parts of a microscope and properly use a microscope.
6. The student will learn to use a centrifuge correctly.
7. The student will be alert to dangers in the laboratory and practice proper safety precautions.
8. The student will correctly prepare blood smears for use in the Hematology laboratory.
9. The student will read assigned material in Linne, Annino, and Seiverd.

EVALUATION:

1. The student will correctly answer oral questions from the instructor.
2. The student will correctly answer at least 70% of the questions on a written examination.
3. The student will successfully complete practical examinations in the use of the microscope, and proper pipetting techniques.

BACTERIOLOGY OBJECTIVES
PRE-CLINICAL

1. Student will receive a brief introduction to basic sterilization techniques, culturing methods, classification of micro-organisms, the Gram's stain and differential media. (three lectures).
2. Student will take throat culture, innoculate plates and broth.
3. Student will subculture from the broth to blood agar plates at the end of 24 hours.

4. Student will pick colonies and perform Gram's stain.

5. Student will identify Gram positive and Gram negative organisms and distinguish between cocci and rods.

EVALUATION:

1. Student will correctly answer at least 70% of questions on a written examination.

MICROBIOLOGY OBJECTIVES
LECTURE

THE STUDENT WILL:

1. Become familiar with the historical background of the field.

2. Identify and describe the various areas of study included in microbiology: bacteriology, parasitology, mycology and virology.

3. Become familiar with bacterial taxonomy.

4. Recognize and identify bacterial morphology and reproduction.

5. Understand bacterial physiology as applied to biological needs.

6. Recognize biological activities of bacteria: enzymes, fermentation, putrifaction, toxins, pigment production.

7. Understand the various methods of studying bacteria including motility, dark-field examination, basic and acidophilic stains and special stains.
    a. special emphasis on Gram's stain and acid-fast staining procedures.

8. Become familiar with cultural methods for studying bacteria:
    a. pure cultures
    b. colony morphology
    c. classifications of culture media
    d. constituents of culture media
    e. plate dilution techniques
    f. steaking plates
    g. innoculating tube media
    h. enumeration of bacteria
    i. aerobic and anaerobic culture methods

9. Become familiar with biochemical methods for studying bacteria:
   a. fermentation methods
   b. MRVP reactions
   c. starch hydrolysis
   d. proteolytic methods
   e. indole production
   f. nitrate reduction
   g. H_2S production
   h. urea production
   i. oxidase reactions
   j. animal innoculation

10. Become knowledgeable about the various methods of specimen collection:
    a. blood cultures
    b. exudates
    c. trasudates
    d. cerebrospinal fluid
    e. urine
    f. feces
    g. sputum

11. Be familiar with methods used in identifying bacteria serologically:
    a. Quelling reaction
    b. agglutination
    c. Precipition-Lancefield
    d. F.A. techniques
    e. complement fixation

12. Understand and state definitions for Koch's postulates.

13. Become familiar with physical means of sterilization including filtration, moist heat (including autoclave), dry heat, fractional sterilization, incineration, ultra-violet radiation, ionization.

14. Become familiar with chemical means of sterilization including antiseptics and disinfectants, the qualities of good disinfectants, the Phenol coefficient, most commonly used disinfectants, gas sterilization, chemotherapeutic agents, and antibiotics (the Kirby-Bauer susceptibility testing technique).

15. Recognize the most commonly occurring pathogenic bacteria as:
    a. Gram positive cocci- staphylococcus, streptococcus, pneumonococcus
    b. Gram negative cocci- Neisseria, Veillonella
    c. aerobic gram positive cocci- Corynebacterium, genue bacillus listeria
    d. anaerobic gram positive and gram negative bacilli-Clostridium, bacteroides
    e. Gram negative bacilli-Enterobacteriaceae, Pseudomonas and related organisms.
    f. fastidious gram negative bacilli-Hemophilus, brucella, Pasturella
    g. mycobacteria-M. tuberculosis, Runyan's groups I, II, III and IV
    h. spirochetes-Treponema, vincent's angina (discussion of dark field examination technique)

16. Recognize commonly occurring pathogenic fungi and fungal diseases: histoplasmosis, blastomycosis, cryptococcosis, candidiasis, infections caused by dermatophytes.

17. Define and understand terms used in field of parasitology.

18. Become familiar with parasitologic methods and techniques: concentration, staining, and identification.

19. Become familiar with life histories and clinical significance of the protozoa, metazoa, trematoda, and cestoidea.

20. Read and answer oral questions on material assigned in Principles of Microbiology, Smith and Atlas of Diagnostic Microbiology, Schneierson.

EVALUATION:

1. Instructor personally observes and evaluates each student as to attentiveness in class, class discussion and questioning, willingness to read assigned material.

2. Students are given at least four written examinations during this period.

BIOCHEMISTRY OBJECTIVES
CLINICAL

FIRST AND SECOND WEEKS

1. The student will properly centrifuge specimens, transfer sera to specimen tubes and label them correctly.

2. The student will take an active part in the quality control program for spectrophotometers, water baths and glassware.

3. The student will read assignments in Annino, Davidson and Henry, Davidson and Wells, and the Sigma Enzyme Procedure manual and will answer study questions on the assigned material.

4. The student will write instructions for each procedure done in the hospital laboratory, listing the principle of the procedure, reagents used, steps of the procedure, normal values, and clinical significance.

5. The student will perform the following minimum number of tests:
    a. amylase-10
    b. acid phosphatase-5
    c. lipase-5
    d. cephalin flocculation-1
    e. urine total protein-2
    f. serum acetone-2
    g. CSF protein and pandy-2
    h. cholesterol-3
    i. inorganic phosphorus-3
    j. bilirubin-3
    k. G-6-PD-1
    l. thymol turbidity-1
    m. gastric (pH meter)-2
    n. BSP-1 (observe injection also)
    o. LAP observe only
    p. ICD observe only

6. In performing these tests, the student will pay special attention to the use of standards and control sera. No results are acceptable unless control falls within range established for the procedure.

7. The student will repeat all procedures until thoroughly familiar with them, with emphasis on proper techniques and accuracy.

8. At the student laboratory (Health Occupations Building), the student will perform the following procedures: Hycel glucose, Hycel direct BUN, total serum protein and globulin, uric acid, SGOT, SGPT, LDH, alkaline phosphatase and creatinine (serum and urine).
    a. a standard curve will be set up for each procedure.
    b. control sera will be run with each group of unknowns.
    c. student will repeat any procedure he is unsure of.
    d. emphasis is on standard curves and use of control sera.

THIRD WEEK

1. The student will correctly operate the IL flame photometer, the chloridometer and the Oxford titrator.

2. The student will take an active part in the maintenance program for these instruments.

3. The student will perform a minimum of 25 each: sodium, potassium, chloride, and bicarbonates.

4. The student will read assigned material and answer study questions.

5. The student will check every set of electrolytes for balance and accuracy.

6. The student will become familiar with the operation of the ACA.

FOURTH WEEK

1. The student will repeat sodium, potassium, chloride and bicarbonate on serum, urine and CSF as ordered.

2. The student will use the Oxford titrator for both serum and urine calcium.

3. The student will perform procedures for micro electrolytes.

4. The student will gain experience in operation of the ACA.

5. The student will read assigned material and answer study questions.

FIFTH WEEK

1. The student will repeat all electrolyte and bench procedures.

2. The student will use both blood gas instruments in determining pH, pCO_2, pO_2, a minimum of 10 times.

3. The student will operate the Co-oximeter for 0_2 saturation at least 10 times.

4. The student will operate the osmometer for serum and urine osmolality at least 5 times.

5. The student will observe at least one sweat chloride procedure.

6. At the student laboratory the student will use the Natelson microgasometer in doing CO_2 content at least 5 times.
   a. the student will perform the Hycel calcium procedure, setting up a standard curve and running a control serum and at least 2 unknowns.

7. The student will read assigned material and answer study questions.

SIXTH WEEK

1. In AM of each day, the student will assist in operation of the Auto-Analyzer in performing glucose and BUN. He will become familiar with names and functions of AA parts, reagents used, principles of the tests, setting up of the curves and reporting of results.

2. In PM of each day, the student will repeat all procedures as they are ordered and will also repeat any procedure he is unsure of, emphasis being placed on accuracy and speed.

3. The student will read assigned material on bromide, salicylate, barbiturate, alcohol and gastric procedures and answer study questions.

EVALUATION:

1. Student is evaluated as to accuracy by each instructor as the student performs procedures already completed by the instructor.

2. Student will answer oral questions from the instructor in informal study sessions.

3. The student will be given a written quiz at the end of the second week and again at the end of the sixth week. These grades determine 1/3 of the final grade in this section.

4. Student will not report any results unless closely supervised by instructor and all controls and standards are accurate.

5. Student will be evaluated for accuracy and precision and willingness to repeat tests in first four weeks. In last two weeks, he is expected to improve in speed as well. 2/3 of the final grade in this section is determined by this evaluation.

BASIC MATH OBJECTIVES
FIRST WEEK

1. Student will be able to multiply, divide, add and subtract numbers containing decimal points.
2. Student will correctly express large and small numbers as exponents of 10, both positive and negative values.
3. Student will use exponential notation in solving problems in multiplication, division, addition and subtraction.
4. Student will use exponential notation in estimating solutions to problems.
5. Student will be able to identify characteristics and mantissa of logarithms as found by inspection and from table of logarithms.
6. Student will use logarithms in solving problems.
7. Student will define square root and be able to extract square roots by using logarithms and square root chart.
8. Student will find cube root of numbers by using logarithms.
9. Student will know metric system and be able to work conversion problems.
10. Student will understand the two temperature scales and be able to convert from one to the other.

BASIC MATH OBJECTIVES
SECOND WEEK

1. Student will understand atomic theory, atomic weight, and molecular weight.
2. Student will understand the meaning of valence.
3. Student will define gram molecular weight, gram atomic weight and gram equivalent weight
4. Student will determine gram atomic weight and gram molecular weights of elements and compounds.
5. Student will understand expressions of concentration in percent, molarity and normality. Also w/w, w/v, and v/v.

6. Student will be able to work problems in which concentration is converted from one expression to another.

7. Student will understand the term "pH" and be able to determine pH from a given hydrogen ion concentration.

8. Student will do calculations to determine necessary steps in making weaker solutions from stronger ones.

9. Student will calculate final concentrations when solutions are diluted. Also dilution factors.

10. Student will calculate weight of solute necessary to make up solutions of varying concentrations.

11. Student will determine molarity and normality of acid solutions made from concentrated commercial acids.

EVALUATION:

1. Student will correctly answer at least 70% of questions on at least three written examinations on material covered in this two week period.

2. The student will successfully perform practical assignments in making reagents, titration and standardization.

CHEMISTRY OBJECTIVES
LECTURE

1. Student receives at least 50 hours of lecture.

2. Instructors assign reading material, prepare hand-outs and use audiovisual aids as they choose.

3. Student is introduced to fundamental principles of organic and inorganic chemistry.

4. Student receives quality control in the chemistry laboratory and calculates standard deviations and reviews use of control sera and standard solutions.

5. Student receives information on specific procedures as NPN, BUN, uric acid, creatinine, protein, carbohydrates, enzymes, liver function tests, and electrolytes.

6. Emphasis is to the placed on clinical significance, normal values, and most commonly used procedures along with reagents and principle involved in these procedures.

7. At least one hour of lecture will be devoted to orientation of student in understanding automation in the chemistry department.

EVALUATION:

1. A written examination is to be given at the end of each week's lectures. The student will correctly answer at least 70% of the questions.

BASIC CHEMISTRY OBJECTIVES

1. The student will correctly write chemical formulas and use these in determining reactions.

2. The student will demonstrate a knowledge of oxidation and reduction.

3. The student will calibrate cuvettes for the Coleman Jr. spectrophotometer.

4. The student will become familiar with the meaning of normal values, group tests, standard solutions and control sera.

5. The student will become familiar with the term "quality control" and will calculate at least one standard deviation and make up at least one control chart.

6. The student will set up standard curves for creatinine, glucose and BUN.

7. The student will use standard solutions in calculating results of cholesterol and creatinine procedures.

8. The student will read assigned material and become familiar with basic principles involved in the procedures for creatinine, glucose, BUN, sodium, potassium, SGPT, and uric acid. (five lectures)

9. The student will become familiar with the use of the IL flame photometer.

0. The student will perform the Schales and Schales chloride procedure at least three times.

EVALUATION:

1. The student will answer at least 70% of questions on at least three written examinations.

2. The student will successfully perform practical examinations on setting up standard curves, use of control sera and determining unknown values for glucose, BUN, sodium, potassium, chloride and uric acid.

MICROBIOLOGY OBJECTIVES
CLINICAL

DURING THIS 6 WEEK PERIOD THE STUDENT WILL:

1. Correctly prepare, dispense and store the following media:
    - a. blood agar plates
    - b. chocolate agar plates
    - c. Hekton plates
    - d. SS plates
    - e. Maconkey plates
    - f. Sabourad's plates
    - g. Mycobiotic bottles
    - h. Mueller-Hinton plates
    - i. special media on occasions
    - j. broths
        - (1) thioglycollate
        - (2) trypticase-soy
        - (3) brain heart infusion
        - (4) todd-hewett
        - (5) GN
        - (6) TSA slants
        - (7) TSI slants
        - (8) lycine iron agar slants
        - (9) agar blanks (Kirby-Bauer)
        - (10) CTA semi-solid (CHO fermentations)

2. Properly prepare and sterilize glassware, with special emphasis on operation of the autoclave and hot-air oven and sterilization and use of dispensing funnels.

3. Be responsible for sorting plates from incubator for reading each morning.

4. Be responsible for correctly entering specimens in the log book.

5. Become competent in planting clinical materials
    - a. use of the proper media for each type of specimen
    - b. correctly label all cultures plates and tubes
    - c. proper streaking techniques
    - d. broth innoculation and blood cultures.
    - e. urine colon-counts
    - f. pick colonies for pure culture studies
    - g. concentration methods for body fluids of mycobacteria-staining and innoculation of media
    - h. setting up and reading Kirby-Bauer procedure for sensitivity
    - i. anaerabic culture methods-gas pack
    - j. reduced oxygen tension-CO_2 jar
    - k. operation and care of incubators (atmospheric and CO_2)
    - l. concentration of fecal specimens for ova and parasites-direct smears and iodine stains
    - m. occult blood in feces

6. Recognize colonial morphology of various genera during early morning plate reading (student does not report interpretations)

7. Perform competently the following staining procedures:
   a. simple stains-methylene blue
   b. Gram's stain - some interpretation of results
   c. Kenyoun acid fast and flourochrome

8. Properly prepare simple reagents and stains with emphasis on Gram's stain

9. Properly perform the slide coagulase reaction of staphylococcus

10. Become familiar with some biochemical reactions - do not make final interpretation.

EVALUATION:

1. Instructor's personal observations of students interest, initiative, technique, and especially his insight and strict performance of proper bacteriologic techniques (safety precautions, etc.)

2. Informal oral examinations daily.

3. Formal testing (usually oral) relative to techniques and methodology at least 2 of these.

IMMUNOHEMATOLOGY OBJECTIVES
LECTURE

1. The student will learn proper techniques for:
   a. donor selection
   b. bleeding procedure
   c. donor reactions
   d. processing of blood
   and necessary precautions and safety measures.

2. The student will become familiar with the ABO system and inheritance of ABO groups and subgroups in immunohematology.

3. The student will be knowledgeable in the Rh-Hr system; inheritance of system; Rh typing and techniques.

4. The student will become familiar with (a) antigens (b) antibodies and immune response (c) antigen-antibody reactions (d) anti-globulin reaction (e) technical procedures as related to immunohematology.

5. The student will become knowledgeable in the area of compatibility testing to include:
    a. general procedures
    b. techniques for compatibility testing
    c. incompatible crossmatch
    d. exchange transfusion
    e. emergency crossmatch
    f. changing to group specific blood after transfusion with group O blood
    g. the group AB recipient
    h. massive transfusions
    i. suggested work outline for incompatible crossmatch

6. The student will be familiar with (a) identification (b) detection (c) absorption (d) elution (e) titration and (f) concentration of antibodies in immunohematology.

7. The student will learn information concerning hemolytic disease of the fetus and newborn to include:
    a. mechanisms of maternal immunication
    b. nature and risk for the offspring
    c. prenatal studies
    d. ABO hemolytic disease
    e. selection of blood for exchange transfusion
    f. prevention of maternal Rh immunization

8. The student will become familiar with blood storage and transportation in the areas of:
    a. refrigeration
    b. donor blood inspection
    c. sterility procedures
    d. requirements for reissue of blood
    e. anticoagulants
    f. freezers for blood component
    g. transportation of blood

9. The student will be familiar with records involved in immunohematology in the areas of:
    a. donor records
    b. record of blood from other banks
    c. record of blood inspection
    d. record of refrigeration temperatures
    e. records of blood culture
    f. records of laboratory testing
    g. transfusion request records
    h. release records
    i. transfusion records
    j. records of suspected transfusion reactions
    k. blood group identification card (a wallet card)

10. The student will demonstrate the ability to correlate information derived from immunohematological procedures with disease process and with other laboratory data.

EVALUATION:

1. The student will successfully complete examinations (4-5) with scores of 70% or better.

IMMUNOHEMATOLOGY OBJECTIVES
PRE-CLINICAL

1. Student will receive introduction to blood groups and types and to antibody screening.
2. Student will accurately perform ABO blood groups and Rh types on unknown specimens.
3. Student will accurately perform at least two antibody screening procedures.

EVALUATION:

1. Students will correctly group and type at least five unknown specimens.
2. Student will answer correctly at least 70% of questions on a written examination.

IMMUNOHEMATOLOGY OBJECTIVES
CLINICAL

1. The student will demonstrate a knowledge of the principles and theory of immunohematology.
2. The student will demonstrate an ability to process donor blood within acceptable limits to include:
    a. cell grouping
    b. serum grouping
    c. anti-AB
    d. Rh typing
    e. antibody screening
    f. anti-A and anti-B titers
    g. serology
    h. Australian antigens (RIA)
    i. Du on all negatives including direct Coomb's control
3. The student will demonstrate an ability to process patients blood for possible transfusion within acceptable limits to include:
    a. cell grouping
    b. serum grouping
    c. anti-A, B
    d. Rh typing
    e. antibody screening
    f. Australian antigen (RIA)
    g. Du on all negatives including direct Coombs control

4. The student will demonstrate a proficiency in performing antibody studies within acceptable limits to include:
   a. Selectogen I & II
   b. Identogen panel
   c. saline titer
   d. albumin
   e. Coombs
   f. cold
   g. room temperature
   h. 37°
   i. indirect Coombs
   j. autocontrol included

5. The student will perform compatibility testing within acceptable limits.

6. The student will show an ability for preparing blood to be used for exchange transfusion within acceptable limits to include:
   a. direct Coombs or cord blood
   b. group and Rh on cord blood
   c. antibody studies on mother's serum
   d. suitable blood selected and crossmatched with mother's serum

7. The student will show an ability to prepare blood for emergency transfusion within acceptable limits in different types of emergencies:
   a. normal procedure with incubation time cut to 15 mins.
   b. blood group and Rh type specific without crossmatch; crossmatch to follow during administration
   c. extreme emergency low titer O negative

8. The student will perform ABO titers to detect both saline and immune anti A and B antibodies within acceptable limits.

9. The student will perform absorptions and elutions on serum within acceptable limits.

10. The student will determine the temperature at which best reactions are obtained within acceptable limits.

11. The student will demonstrate an ability to evaluate the effect of technical situations on immunohematologic procedures.

12. The student will demonstrate an ability to correlate data derived from immunohematologic procedures with disease process and with other laboratory data.

EVALUATION:

1. The student will demonstrate proficiency by accurately performing specific tests on known sera within acceptable limits.

2. The student will answer oral questions concerning the work that he is performing correctly.

SEROLOGY OBJECTIVES
CLINICAL

1. The student will demonstrate a proficiency in the testing of serums for the following serological tests (a) VDRL, qualitative and quantitative (b) pregnancy test (c) antistreptolysin O titer (d) rheumatoid arthritis (e) C-reactive protein (f) febrile agglutination (g) monotest (h) colloidal gold within acceptable limits.

2. The student will be familiar with the theories and principles involved in the above serological tests.

3. The student will demonstrate a knowledge of the possible effects of technical situations on a particular serological test.

4. The student will demonstrate an ability to correlate information and data derived from serological determinations with disease process and with other laboratory data.

5. The student will demonstrate an ability to evaluate accuracy of testing and make judgments accordingly.

EVALUATION:

1. Student will successfully complete written examinations with a score of 70% or better.

2. Student will demonstrate proficiency by performing given tests within acceptable limits with known samples previously completed by the instructor.

HEMATOLOGY
LECTURE PHASE AND PRE-CLINICAL

1. The student will receive at least 50 hours of lecture in Hematology.

2. The student will read assigned material in Linne, Seiverd, Davidson and Wells, and Davidson and Henry.

3. The student will listen to and answer questions on lecture tapes of the Listen, Look and Learn series on Hematology.

4. The student will have five hours of lecture in Hematology from a staff pathologist in addition to the 50 hours lecture by the instructor.

HEMATOLOGY OBJECTIVES FIRST WEEK PRE-CLINICAL AND LECTURE PHASE

1. Student will review and try to improve techniques for drawing blood samples.

2. Student will review types of anticoagulants most commonly used in laboratory.

3. Student will be thoroughly familiar with the hemacytometer and its uses.

4. Student will be able to do manual white cell and red cell counts and understand the dilution factors employed and be able to calculate results.

5. Student will identify the types of hemoglobin and be familiar with various tests used in determining hemoglobin concentration.

6. Student will be familiar with the hematocrit determination and the methods for determining this value.

7. Student will be able to determine the various indices by using hemoglobin, hematocrit and red cell counts to make the calculations.

8. Student will be familiar with function of platelets and methods for performing manual platelet counts using hemacytometer.

9. Student will be familiar with the erythrocyte sedimentation rate and the methods for determining this value.

10. Student will know the normal values for red and white cell counts, hemoglobin, hematocrit, sedimentation rate, platelet count and the various blood indices.

HEMATOLOGY OBJECTIVES SECOND AND THIRD WEEKS PRE-CLINICAL AND LECTURE

1. Student will understand the maturation process involved in the production of white cells, identify the various series and recognize normal and abnormal cells.

2. Student will be able to perform accurately a normal white cell differential cell count and know normal percentage values for the various white cells.

3. Student will understand the steps in the maturation of the erythrocytes, naming and recognizing the immature stages.

4. Student will recognize the various abnormal red cells found in a blood smear.

5. Student will be familiar with the reticulocyte count and the methods for determining this count.

6. Student will be familiar with procedure for doing osmotic fragility tests and know how to interpret results.

7. Student will be familiar with screening procedures for sickle cell examination.

8. Student will perform platelet counts, direct eosinophil count and CSF cell counts.

9. Student will understand principle of hemoglobin electrophoresis.

10. Student will understand process of obtaining and staining bone marrow and be familiar with normal marrow cell count.

11. Student will recognize the various classifications of anemias and their typical blood pictures.

12. Student will recognize the various types of leukemias and recognize their typical blood pictures.

HEMATOLOGY OBJECTIVES FOURTH WEEK
PRE-CLINICAL AND LECTURE

1. Student will understand what is meant by hemostasis and will be able to identify blood coagulation factors and explain their various roles in the theory of coagulation.

2. The student will properly perform the Ivy bleeding time and the Lee-White coagulation time.

3. The student will have a basic understanding of the tests performed as screening procedures and specific coagulation procedures. The student will correlate results with identification of the blood coagulation factors.

4. The student will perform the prothrombin time procedure at least six times and the partial prothrombin time at least three times using the tilt tube method.

HEMATOLOGY
EVALUATION

1. The student will correctly answer at least 70% of questions on at least four written examinations.

2. The student will adequately demonstrate proficiency in practical assignments on platelet counts, differentials, prothrombin time, bleeding and clotting times, clot retraction, manual and Coulter red blood counts, white blood counts and hemoglobins, sedimentation rate and reticulocyte count.

HEMATOLOGY OBJECTIVES
CLINICAL

MANUAL CELL COUNTS

1. The student will demonstrate a proficiency in the enumeration of cellular elements (a) leukocytes (b) red cells (c) platelets (d) eosinophils.

2. The student will demonstrate a knowledge of cell counting (a) list and discuss the possible effects of technical situations on hemocytometer counts (b) calculation of results of hemocytometer counts using various dilutions, types of chambers and sets of data.

3. The student will demonstrate the ability to correlate information and data derived from hematological determinations with disease process and with other laboratory data.

4. The student shall demonstrate an ability to evaluate accuracy and precision of methods used and make judgments accordingly.

AUTOMATED CELL COUNTS

1. The student will demonstrate proficiency in the enumeration of cellular elements (a) leukocytes (b) red cells.

2. The student shall perform and evaluate quality control procedures within acceptable limits.

3. The student shall explain the effects of the following situations on automated leukocyte counts:
   a. marked rouleaus and/or autoagglutination
   b. increased time between red cell lysis and counting
   c. partial aperature blockage
   d. contaminated diluent
   e. use of too much lysing agent

4. The student shall demonstrate the ability to correlate information and data derived from hematological determinations with disease process and with other laboratory determinations.

5. The student will demonstrate an ability to evaluate accuracy and precision of methods and make judgment accordingly.

HEMOGLOBINOMETRY

1. The student performs cyanmethemoglobin concentrations of whole blood in an accurate and reproducible manner.

2. The student shall standardize a colorimeter for the cyanmethemoglobin method, using a commercially prepared standard.

3. The student will predict the effect of technical situations on the results of cyanmethemoglobin concentrations.

4. The student will demonstrate the ability to correlate information and data derived from hematologic determinations with disease process and with other laboratory data.

5. The student will demonstrate an ability to evaluate accuracy and precision of methods used and make judgments accordingly.

SEDIMENTATION RATE

1. The student will determine the sedimentation rate of red cells in whole blood.

2. The student will explain the effect of technical situations on the sedimentation rate of red cells.

3. The student will explain the effect of different types of pathological conditions on the sedimentation rate and cite an example.

RED CELL MORPHOLOGY

1. The student will demonstrate familiarity with hematology morphology (a) recognize normal red cell morphology (b) recognize abnormal red cell morphology (c) list the stages of red cell maturation and describe each.

2. The student will demonstrate the ability to correlate information and data derived from hematologic determinations with disease process and with other laboratory determinations.
    a. list and explain factors which influence the development of the cellular elements
    b. classify the anemias according to indices

3. The student will demonstrate an ability to evaluate accuracy and precision of methods used and make judgment accordingly
    a. indices vs. red cell morphology

LEUKOCYTE MORPHOLOGY

1. The student shall demonstrate familiarity with hematologic morphology (a) recognition of normal leukocytes (b) recognition of abnormal leukocytes (c) describe by words or drawings the stages of development of the myeloid and lymphoid series.

2. The student shall demonstrate the ability to correlate information and data derived from hematologic determinations with disease process and with other laboratory determinations (a) factors which influence development of cellular elements (b) effects of specific disorders (c) classification of leukemias according to predominate cell.

3. The student will demonstrate the ability to correlate information and data derived from hematologic determinations with disease process and with other laboratory data.

4. The student will demonstrate an ability to evaluate accuracy and precision of methods and make judgments accordingly.

RETICULOCYTE COUNTS

1. The student will demonstrate a proficiency in the enumeration of reticulocytes within acceptable limits.

2. The student will be familiar with hematologic conditions which affect the reticulocyte count.

3. The student will demonstrate an ability to evaluate accuracy and precision of methods and make judgments accordingly.

EVALUATION:

1. The student shows proficiency by performing specified tests within acceptable limits on known samples.

2. The student is tested with a written examination on which he must complete at least 70% of the questions correctly.

URINALYSIS OBJECTIVES
LECTURE

1. The student will become familiar with anatomical structure of the urinary system.

2. The student will be familiar with the functions of the kidney.

3. The student will be familiar with the formation of urine and the normal constituents of urine.

4. The student will be familiar with normal physical properties and understand the cause and significance of abnormal physical properties.

5. The student will be familiar with methods commonly used for determining physical properties.

6. The student will be familiar with chemical tests routinely used in urinalysis and understand the cause and significance of abnormal results to include test for (a) glucose (b) protein (c) hemoglobin (d) ketones (e) bilirubin (f) urobilinogen.

7. The student will learn the elements which may be found in urinary sediment and understand the cause and significance of each.

8. The student will be familiar with special tests which have to do with renal function and the testing for renal function to include (a) urea clearance (b) creatinine clearance (c) PSP (d) concentration tests.

9. The student will become familiar with methods commonly used for the determination of routine chemical tests in urinalysis to include (a) glucose (b) protein (c) hemoglobin (d) ketones (e) bilirubin (f) urobilinogen.

10. The student will observe the effect of abnormal constituents on urinary chemical tests.

11. The student will be able to show an ability to correlate findings in the area of urinalysis with disease process and other laboratory data.

EVALUATION:

1. The student will complete three written examinations with a score of 70% or better.

URINALYSIS OBJECTIVES
PRE-CLINICAL

1. The student will become familiar with the anatomical structure of the urinary system and the formation of urine.

2. The student will observe and learn the normal physical properties of urine to include (a) color (b) transparency (c) odor (d) specific gravity.

3. The student will observe and learn the significance of abnormal physical properties to include (a) color (b) transparency (c) odor (d) specific gravity.

4. The student will become familiar with the principles of the chemical tests routinely performed in urinalysis to include (a) pH (b) glucose (c) protein (d) ketones (e) blood (f) bilirubin.

5. The student will become familiar with the significance of abnormal findings in routine chemical tests in urinalysis.

6. The student will become familiar with the constituents which may comprise the urinary sediment both normal and abnormal and the significance of abnormal constituents.

EVALUATION:

1. The student will successfully complete a written examination with a score of 70% or better.

2. The student will perform tests to include (a) color (b) transparency (c) odor (d) specific gravity (e) pH (f) glucose (g) protein (h) bilirubin (i) ketones (j) blood (k) microscopic within acceptable limits.

URINALYSIS OBJECTIVES
CLINICAL

1. The student will observe routine physical properties of urine within acceptable limits.

2. The student will perform routine urine chemical tests both normal and abnormal with in acceptable limits.

3. The student will perform routine microscopic examinations of both normal and abnormal urinary sediment within acceptable limits.

4. The student will demonstrate a knowledge of the principles of urological examinations.

5. The student will demonstrate the ability to correlate information and data derived from urological determinations with disease process and with other laboratory data.

6. The student will perform parasitological specimen preparation within acceptable limits.

7. The student will observe parasitological preparations for ova and parasites within acceptable limits.

8. The student will perform routine tests for fecal occult blood within acceptable limits.

9. The student will demonstrate an ability to evaluate accuracy and precision of methods and make judgments accordingly.

EVALUATION:

1. Students performs specific tests within acceptable limits on known samples.

2. Student completes a written examination with a score of 70% of better.

SEROLOGY OBJECTIVES
LECTURE

1. The student will be familiar with the basic principles and techniques of serological testing.

2. The student will learn the principle involved in the performance of the various tests for (a) syphilis (b) infectious mononucleosis (c) rheumatoid arthritis (d) C-reactive protein (e) pregnancy (f) streptococcus infection (h) colloidal gold.

3. The student will become familiar with the effect of both technical and physical situations on serological tests.

4. The student will learn to correlate information and data derived from serological examinations with disease process and with other laboratory data.

EVALUATION:

1. Student will complete three written examinations with a score of 70% or better.

SEROLOGY OBJECTIVES
PRE-CLINICAL

1. The student will be introduced to the basic principles of serological procedures.

2. The student will be familiar with the cause and significance of abnormal serological results.

3. The student will perform serological tests to include (a) VDRL qualitative and quantitative (b) monotest (c) heterophil (d) febrile agglutinations (e) pregnancy tests (f) ASLO (g) rheumatoid arthritis tests as introduction to serology and within acceptable limits.

EVALUATION:

1. The student will successfully complete three written examinations with a score of 70% of better.

2. The student will show acceptable performance of tests within acceptable limits.

Chapter 1

INTRODUCTION

ARTICULATION FOR RADIOLOGIC TECHNOLOGY PROGRAMS

Radiologic technology involves the proper use of x-ray and other radiation-producing equipment and material on human tissues. Radiologic technology is a two-year program designed to help students integrate the academic, technical, and human relations aspects of their education and enable them to do significant work in their chosen health field as useful and active citizens.

As the science of radiology has grown in use and complexity, the demand for personnel trained in advanced techniques and management skills is also growing. The program provides a foundation of basic knowledge and principles both in general and technical education and practical experience to insure competence and skill in performance. At present, most basic educational programs are two year post-high school programs which prepare students to assume the responsibilities and duties of a staff level Radiologic Technologist (R.T.) and qualify them for certification by the American Registry of Radiologic Technologists (ARRT).

Under the direction of a radiologist, or qualified physician, the graduate performs diagnostic x-ray examinations, assists with special surgical x-ray procedures, processes radiographs, and assists in the administration of radiation therapy. Graduates are prepared to perform basic record and file procedures, managerial tasks, and limited supervisory activities.

In addition to this basic program the student may choose advanced education career possibilities such as: Nuclear Medicine Technology, Radiation Therapy Technology, Associate or Baccalaureate Degrees in Radiologic Technology. The first two degrees are highly specialized, hospital or University-based training programs; the latter two, (associate and baccalaureate degree programs), lead to a broader educational experience which may better prepare the student for administration, teaching and/or other related fields.

In Kentucky, the opportunity for specialized study is limited in that no approved specialized training programs exist in the State. Because of this, the need to provide a channel by which one could supplement technical training with academic work appears to be a relatively high priority based on current demand for highly skilled professionals and the need for providing career mobility and advancement to interested persons. Thus, there needs to be developed a network which would facilitate the transfer of "vocational" credit, which the R.T. has previously acquired in the training certification program to the University setting, enhancing the prospects of career mobility and advancement. The feasibility of this concept will be explored in this analysis through a case study of the Madisonville State Vocational-Technical School's Radiologic Technology Program as it relates to Murray State University and other state universities.

The main emphasis of this articulation project is to discover if articulation can be accomplished from the vocational to the university setting, enhancing the prospects for career mobility and personal advancement. Though the Madisonville School and Murray

State are used in the case study, the model is to be applicable throughout the state for all approved Radiologic Technology programs and state universities.

Nature of the Study

As previously stated, the purpose of this study is to explore the possibilities of developing a universal means of credit transfer from the vocational or hospital-based R.T. training program to the university setting. At present two State Universities, Western Kentucky University and University of Kentucky, offer Associate Degrees of Radiologic Technology to R.T.'s who satisfactorily complete one additional year of academic studies based on certain required courses. These programs will be discussed in greater detail in succeeding sections. In keeping with this purpose, the study will examine the ability of Associate Degree R.T.'s to receive advanced credit for Baccalaureate Degrees in Radiologic Technology offered in other states or other related baccalaureate degree programs in Kentucky.

The methodology used in the development of this project includes an accurate survey of the vocational curriculum and level of instruction of Madisonville's R.T. program to establish if articulation[1] is possible. The fact that this is presently being done at two State Universities seems to substantiate that this, in reality, can be accomplished. The proposal will then be designed in the following manner:

1. Develop the criteria necessary to articulate from the vocational program to college level (establish and document a procedure by which students can receive college credit),

2. Recommend the most logical and educationally sound method of accomplishing credit transfer, examining the possibility of pursuing a different field of study, as well as advanced study related to the sciences,

3. Define means of evaluating the success of the model.

The overall objective of the proposal is to explore the alternatives which need to be made available to the student coming into the college setting from vocational schools, in that students may desire to advance in the same profession or redirect their efforts to an alternative field. The model shall be developed in a manner in which the integrity of both the Madisonville and the Murray programs is maintained and in a way which offers maximum opportunity to the student.

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[1] More definitively, articulation can be interpreted to mean either sequential curriculum, transferable credits, or both in order to provide for the development of a career ladder.

Chapter 2

GENERAL DESCRIPTION OF MADISONVILLE PROGRAM ARTICULATION FOR RADIOLOGIC TECHNOLOGY PROGRAMS

The Radiologic Technology program offered at the Madisonville State Vocational-Technical School Health Occupations Annex is under the direction of Dr. Selby Coffman, Radiologist of Trover Clinic. The program is nationally accredited based on the professional criteria established by the Council of Medical Education of the American Medical Association, in collaboration with the American Society of Radiologic Technologists and the American College of Radiology.

Organization and Admissions

The Madisonville program has affiliation agreements with local hospitals and clinics providing the student with actual clinical training. Approximately 2400 hours of the 3000 hour program are spent in one or more of the clinical areas listed below: Hopkins County Hospital, Trover Clinic (with satellites at Earlington, Providence, and Morganfield), Murray-Calloway County Hospital, Muhlenberg County Hospital, Community Methodist Hospital (Henderson), Jennie Stuart Memorial Hospital (Hopkinsville) and U. S. Army Hospital at Fort Campbell.

The school is approved for 15 students in each class, thus a maximum of 30 students can be involved in the 24-month program in any given year. Students are admitted to the program based on high school performance and a personal interview with the admissions committee. The committee is composed of: the Radiologic Technology director, Education Coordinator, Assistant Education Coordinator, and Coordinator of Health Occupations Annex of the Madisonville State Vocational-Technical School.

Faculty

In addition to the Director of the program who conducts lectures and gives formal supervision, two full-time instructors are involved in the Madisonville program. Both are ARRT Certified Radiologic Technologists whose duties involve coordinating the pre-clinical and clinical aspects of the students' program and conducting daily teaching sessions with the students. In addition, the Chief Technologists of affiliated hospitals supervise the clinical aspects of the program.

Instruction and Licensure

Methods of instruction include:

1. Lectures made by instructors as well as outside lecturers.
2. X-ray lab for demonstration and practice.
3. Clinical experience in hospital and clinics.

4. Use of audio-visual aids, filmstrips, transparencies, movies, slides, charts and models.

5. Workshops and field trips.

The first 10 weeks of instruction are spent in the classroom learning the basic anatomy and physics of the x-ray program. The rest of the two-year program is spent in both classroom and clinical areas. Approximately 600 hours are spent in the classroom and 2400 hours in the clinical setting. This on-the-job training with supervision by Registered Technologists and Radiologists is considered invaluable in the training of the qualified technician.

On completion of the program the student must take a National Registry Examination. Upon passing this examination, graduates become Registered Technologists and are allowed to put the letters ARRT (American Registered Radiologic Technologist) after their names.

Course Outline and Equipment

The objectives of the program are to give the student a basic knowledge of the various systems, structures, and organs of the body and their functions which enables the student to: interpret accurately requests for x-ray examinations, to properly position the part of the area to be radiographed, to recognize the structures and organs visualized, and to understand the normal functions of organs as a basis for certain x-ray examinations, to clarify and incorporate ethical principles involved in Radiologic Technology, to teach the importance of patient-technologist relationships (the patient being the primary concern), to enable the student to grasp clearly and skillfully the technical and theoretical knowledge and practice necessary for competency and efficiency in the field of technology, and to be prepared to assume responsibility as a graduate Radiologic Technologist with ease and confidence.

The program is divided into two phases integrating didactic and clinical activities. The classroom training gives the student the theoretical background from which the clinical experience becomes more meaningful. An outline of the curriculum is found below:

TABLE 2-1

MADISONVILLE RADIOLOGIC TECHNOLOGY CURRICULUM

AHS 164	Topographic Anatomy & Physiology
AHS 168	Basic Elements of Darkroom Chemistry & Radiologic Technology
AHS 267	Medical Terminology
AHS 146	Electricity and Magnetism
AHS 163	Radiographic Technique I
AHS 165	Radiation Protection
AHS 166	Radiographic Positioning I
AHS 260	Intro. to Oral Radiography
AHS 261	Radiographic Technique II
AHS 262	Radiographic Positioning II
AHS 263	Radiation Therapy & Nuclear Medicine Technology
AHS 264	Pediatric Radiography
AHS 268	Research, Nuclear Medicine, Therapy or Diagnostic Radiology (Electives)
AHS 167	Radiologic Physics
AHS 265	Advanced Positioning in Radiography
AHS 266	Advanced Technique in Radiography

Additional information on each course is found in Attachment I.

To further assure quality control each student must pass a pre-registry or challenge examination before he or she is recommended for testing by the American Registry of Radiologic Technologists.

Textbooks used in the Radiologic Technology program include:

Radiographic Exposure and Processing

Fundamentals of X-Ray and Radium Physics

Handbook of Anatomy and Physiology

Textbook of Anatomy and Physiology

Formulating X-Ray Technique

Atlas of Roentgenographic Positions

Equipment includes:

Radiation meter, Victoreen model
Cutter – X-ray film corner, Halsey model
Overhead projector
Stepwedge with spinning top
Phantom full body model
Survey meter
X-Ray film dryer, Bar Ray model
X-Ray view box, 4 bank Halsey model
X-Ray view box, stainless steel
Radiographic X-Ray unit to include X-Ray generator table, tube stand
X-Ray developing tank, stainless steel with refrigerator unit
X-Ray film chest, X-Ray rack
X-Ray film bin, Halsey model

Evaluation

The x-ray program is evaluated at the end of each two-year class by a simulated registry exam. Periodically, evaluation forms are given to the students to receive their comments and suggestions on different phases of the program. An advisory committee also meets before each new class to discuss strengths and weaknesses of the present program.

Student evaluation is based on classroom and clinical performance and records are kept on each student's performance in the didactic and clinical area. Classroom progress is evaluated by written tests, and an evaluation sheet is filled out by the Chief Technologists and staff of the Hopkins County Hospital and Trover Clinic showing the progress of each student during their clinical phase.

Associate Degree in Radiologic Technology

An associate degree in Radiologic Technology has been approved by the University of Kentucky and Western Kentucky University. The student has the option of selecting either of these programs to correspond to his or her vocational program. The associate degree has proven to be in high demand among students and past graduates of the Madisonville program. In the 1975 class, seven of the nine students participated in one of the associate degree programs, while eleven of the fourteen members of the 1976 class are seeking associate degrees.

Job Opportunities

The Madisonville Health Occupations Annex is directly associated with the growing institutions of Hopkins County Hospital and the Trover Clinic. These alone provide for a vast employment opportunity. There is an appropriate employment rate by these and surrounding hospitals of 75 per cent or more.

Summary

The philosophy of the R.T. program is to produce high quality, well-trained Radiologic Technicians, maintaining high standards of practice to meet growing needs of surrounding hospitals. Since the American Medical Association has approved the program through rigidly established criteria, the quality of education should not be of major concern. Yet it is noteworthy that the school far surpasses the general American Medical Association curriculum and technical requirements. A measure of this general effectiveness can be made in comparing Madisonville's average scores on the registry examination with other accredited schools in Kentucky. A comparison over the past three years reveals that the Madisonville program is one of the better programs in the State.

Based on the general accreditation status and student standing compared to other accredited programs, it is believed that the Madisonville Radiologic Technology program is a quality program with capable staff and clinical facilities. From this conclusion and the fact that two State Universities have already satisfactorily incorporated the Radiologic Technology program into an Associate Degree for Radiologic Technology, it was determined that articulation was indeed possible. The methods by which credit transfer could be achieved are forthcoming.

Chapter 3

THE MODEL AND AFFINITY WITH MURRAY STATE UNIVERSITY ARTICULATION FOR RADIOLOGIC TECHNOLOGY PROGRAMS

Existing Programs

The method by which articulation can be accomplished from the vocational Radiologic Technology program to the University level can best be established through an examination of existing programs, i.e., Bowling Green Community College of Western Kentucky University and University of Kentucky's Madisonville Community College. Both advanced degree programs are specifically designed to prepare students to work as radiologic technologists in hospitals, clinics, other health agencies and offices. Employment opportunities in these fields are excellent, and those completing the A.S. Degree have more job mobility, a career ladder, and increased earning capacity.

The program offered by Western requires 64 credit hours to be completed in two phases. The technical-clinical phase of the Associate of Science Degree consists of twenty-four months of instruction under the auspices of the Madisonville State Vocational-Technical School. This school meets the standards of the American College of Radiology, the American Society of Radiological Technologists, the Council on Medical Education of the American Medical Association. The Madisonville State Vocational-Technical School is also accredited by the Southern Association of Colleges and Schools.

Students who successfully complete the technical-clinical program, and pass the examination required by the American Registry of Radiologic Technologists in order to be certified as a registered radiologic technologist, are awarded a block of 39 credit hours toward an Associate of Science Degree in Radiologic Technology. Under these same conditions the 39 credit hours may also apply toward a minor in Radiologic Technology in completion of a baccalaureate degree.

To qualify for the Associate of Science Degree in Radiological Technology, students must fulfill the following requirements:

1. The student must pass the examination given by the American Registry of Radiologic Technologists.
2. A minimum of a grade point average of 2.0 must be maintained.
3. A minimum of 12 credit hours of work must be taught under the auspices of Western Kentucky University, with at least eight weeks of on-campus residency. (Courses taken through Health Occupations Annex count as on-campus)
4. A total of 25 college credit hours must be earned as follows:

Required Courses (17 credit hours)

English 101, Freshman English	3 cr. hrs.
Psychology 250, Personality Adjustment & Mental Hygiene	3 cr. hrs.
Health & Safety 344, Health Systems Management	3 cr. hrs.
Health & Safety 100, Personal Health	3 cr. hrs.
BEOA 101 or 201, Beginning & Intermediate Typing	3 cr. hrs.
Sociology 295, Society, Personality & Behavior	3 cr. hrs.

Elective Courses (8-9 credit hours)

Health & Safety 171, First Aid	1 cr. hr.
Health & Safety 361, Community Health	3 cr. hrs.
Health & Safety 482, Principles of Epidemiology	3 cr. hrs.
Nursing 290, Medical Terminology	2 cr. hrs.
BEOA 316, Office Procedures	3 cr. hrs.
BEOA 350, Business Communications	3 cr. hrs.
Humanities (select one course)	3 cr. hrs.
Physics 232, Introduction to Physics and Biophysics II	3 cr. hrs.
Physics 208, Lab	1 cr. hr.

The program offered by University of Kentucky requires 68 credit hours also to be completed in two phases. The student is given 36 credit hours for completion of his technical-clinical work upon passage of a challenge exam prepared by the Education Coordinator at the Health Occupations Annex and the instructors and advisors of the Lexington Technical Institute of University of Kentucky. Like the Western program, students enrolled in the Madisonville Community College are required to receive certification prior to obtaining their associate degree.

A total of 32 credit hours must be earned in academic work completed at the Madisonville Community College, for a total of 68 credit hours required in earning the Associate of Science Degree. These courses consist of:

Required Courses (16 hours)

English 101, Freshman Composition	3 cr. hrs.
English 102, Freshman Composition	3 cr. hrs.
Math 122, Fundamental Concepts of Math I	3 cr. hrs.
AHS 160, Integrated Human Biology I or AHS 161, Int. Human Bio. II	4 cr. hrs.
Psychology 104, Basic Psychology I or Psychology 210, General Psychology	3 cr. hrs.

Elective Courses (16 credit hours)

Area V, Humanities: Literature, Art, & Music	
Area VII and VIII, Social & Behavioral Science	6 cr. hrs.
Area II, Physical Sciences	
Area III, Biological Sciences	
Area VII, Social & Behavioral Sciences	3-4 cr. hrs.

Elective Courses (cont'd.)

Area V, Humanities: Literature, Art, & Music	3 cr. hrs.
Area VI or VII, History or Social Sciences	3 cr. hrs.

Enrollment in either program depends on high school graduation, aptitude and desire for the training and a willingness to work.

Curriculum Development

There are various alternatives available in facilitating the receipt of college credit for vocational education. The implementation of a challenge examination prepared by the education coordinator of the vocational program or college instructor is one alternative used at the Lexington Technical Institute to demonstrate the student's proficiency in mastering course material. However, if the student can pass the ARRT certification examination, the challenge examination then appears unnecessarily redundant. In situations where the Radiologic Technology program is accredited by the professional accrediting agency, it is implied that the curriculum design and faculty meet or surpass certain standards of quality. For this reason, it is believed that students who have satisfactorily completed an American Medical Association approved program and who have received certification should be granted block credit for technical courses and clinical work in Radiologic Technology.

The Madisonville curriculum has been broken down by University of Kentucky and Western to 36 and 39 credit hours respectively. It is believed that this range or credit is an adequate appraisal of the students' technical-professional expertise. The Associate of Science Degree for University of Kentucky and Western require an additional 32 and 25 credit hours respectively. Individual universities and departments have varying requirements for granting the associate degree, thus no predetermined minimum degree requirements must necessarily be made in this model. Nevertheless, the total 64 to 68 credit hours required by the two Kentucky universities involved seems reasonable.

Thus, the model must remain flexible in its suggested granting of credit and suggested associate degree requirement to reflect the individual and institutional needs throughout the state of Kentucky. However, it is believed that the 36-39 block credit hours granted for the vocational-technical experience is adequate as is the 64-68 total Associate of Science degree requirements.[1]

Murray State University Associate of Science Degree: Radiologic Technology

Based on curriculum and course objectives of the Madisonville program, and a review of texts and other course material, the Associate of Science Degree: Radiologic Technology at Murray State University was developed with the following requirements. This, like the other programs, is an example of how an associate degree in Radiologic Technology could be built around a general university curriculum for other schools in Kentucky.

(See following page)

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[1] It should be noted that at most universities in Kentucky, credit is presently granted in Industry and Technology courses for vocational work experience up to or exceeding the amount recommended in the model.

TENTATIVE

Associate of Science Degree: Radiologic Technology
Murray State University

Requirements:

1. The student must have satisfactorily completed an ARRT approved program and be a Certified Radiologic Technologist. The student will then be awarded 36 block credit hours which can be applied to an Associate of Science Degree: Radiologic Technology in the College of Industry and Technology.

2. The student must complete an additional 32 hours of academic credit to obtain the associate degree. General education requirements are:

Communications and Humanities 6 hours Composition (ENG 101, 102) 3 hours Art, Music, or Speech, etc.	9 hours
Mathematics and Science Physics, Math, Chemistry, or Biology	8 hours
Social Science Economics, Geography, History, Political Science, etc.	6 hours
Industry and Technology Courses related to desired area of specialty	9 hours
	32 hours

3. The student must maintain a 2.0 G.P.A. in all work attempted.

The advantages of this model are several. First, it permits both the student and the professional clinician to be involved in the pursuit of a higher degree if he or she so desires. Secondly, it permits the Certified Radiologic Technologist to branch out into other related fields, i.e., education or administration. Finally, the career ladder is highly developed in that the missing link from the certification to the baccalaureate degree presently being offered at institutions in Kentucky and other states is provided. Thus, the associate degree student should be able to ladder into a baccalaureate program in Health Science offered by the University of Kentucky or into a program in Radiologic Technology such as the one offered in Tennessee. Outlines of the Bachelor of Health Science degree requirements for the University of Kentucky and the baccalaureate program offered at the University of Tennessee in Memphis are found as Attachment II. Though the baccalaureate degree in Radiologic Technology is a relatively new concept, it is expected that this link in the career ladder will soon become a popular choice in career selection as it offers the opportunity for advanced career mobility and specialization unattainable in present certificate and associate degree programs.

Chapter 4

PROGRAM EVALUATION AND DISSEMINATION

ARTICULATION FOR RADIOLOGIC TECHNOLOGY PROGRAMS

As emphasized in the previous sections, the model, or various alternatives, should have applicability throughout the Commonwealth of Kentucky. The course requirements (for credit transfer) are basic courses undoubtedly offered at all four-year colleges and many community colleges in the State. The philosophy for giving credit for credit earned is sound and the concept of the career ladder is essential to planning for health professions. In order for the model to be utilized by both vocational schools and the universities, it must be relayed to these institutions, registrars, and prospective students. In addition, the Radiologic Technologist presently working in the hospital laboratory or clinic may or may not be aware of the opportunities of career laddering to the associate degree or to the baccalaureate degree offered; for example, at the University of Tennessee. Thus, the person in the laboratory field should also receive information on this "Articulation Project," once it is in effect statewide.

The plan for dissemination of the model by the Bureau of Vocational Education to the state universities should include: 1) copies of the curriculum of each Associate Radiologic Technology Program in the State with a complete delineation of credit received and curriculum requests; 2) the recommendations of credit transfer established in this proposal, i.e., philosophy and credit designations; and 3) an explanation of the ladder concept as applied to Radiologic Technology. Once it is established that other universities will implement the model or an alternative, students in vocational programs and hospital personnel should be notified of their local university's attempt to implement a system of credit transfer.

The process of evaluation based on the student's performance in the university setting is a tool to justifying or modifying the credit transfer. As many students from the Madisonville program are already enrolled in the Western and University of Kentucky programs, the process of evaluation of the model is simplified considerably. These students' academic performance can be correlated to their performance at the Madisonville Health Occupations Annex and their certification test scores, in order to justify credit transfer and to determine if more rigid levels or standards of minimum acceptability need to be established. It is suspected that many students and professionals will take advantage of the credit transfer, and these students should also have input into the implementation of an evaluation mechanism.

Summary

The model developed for the articulation of the Radiologic Technologist reflects flexibility in occupational progress and mobility based on educational background and prowess. The exemplary position taken in the development of strategies allows for instruments of credit assessment and transfer to be modified depending on the institutions involved. Specific criteria for credit transfer include:

1. Meet requirements for admission to the University including high school graduation and acceptable college entrance exam scores.

2. Forward a satisfactory transcript from an approved vocational school, reflecting graduation, and certification.

It cannot be stressed enough that, though this process of articulation is only an example of how the career ladder concept is applied to Radiologic Technology at Murray State and Madisonville, the emphasis is upon making the model applicable statewide, effecting not only the student R.T., but also the clinician. The intent of the development of the model is to provide improved channels for personal advancement as well as ultimately improving the quality of the profession.

ATTACHMENT 1

SUMMARY

ALLIED HEALTH COURSES

AHS 146 ELECTRICITY AND MAGNETISM (3)

An elementary lecture and demonstration course covering basic theory of mechanics, electricity and magnetism. Systems of units commonly used in physics text are introduced early in the course. Considerable time is devoted to the qualitative development of atomic theory and the theory of electronic orbitals. Electrical concepts are explained on the basis of Coulomb's laws; again, de-emphasizing the vector nature of the subject. Motors, generators, measuring devices, and control devices are presented with a viewpoint toward the practical application.

AHS 163 RADIOGRAPHIC TECHNIQUE I (3)

A presentation of the principles of radiographic techniques as related to the basic factors affecting radiographic exposure.

AHS 164 TOPOGRAPHIC ANATOMY AND PHYSIOLOGY (1)

The application of radiography and the study of human anatomy with emphasis on localizing internal structures and organs by external landmarks.

AHS 165 RADIATION PROTECTION (1)

Through lecture and demonstration, the student will become familiar with the principles and applied methods of radiation protection in the operation of radiographic equipment.

AHS 166 POSITIONING IN RADIOGRAPHY I (2)

A study of the basic principles of radiography employed to demonstrate the various structures and organs of the body with emphasis on the skeletal system.

AHS 167 RADIOLOGIC PHYSICS (2)

A study of the basic fundamental laws of magnetism and electricity as applied to the production of x-rays.

AHS 168 BASIC ELEMENTS OF RADIOLOGIC TECHNOLOGY AND DARKROOM CHEMISTRY (2)

This is a consolidated course which will serve to introduce the student to radiologic technology by acquainting him/her with professional ethics, elementary radiation protection, and a brief study of the nature of x-ray radiation.

AHS 260 INTRODUCTION TO ORAL RADIOGRAPHY (1)

Through lecture and demonstration, the student is acquainted with the technical aspects of dental radiography. Clinical experience affords the student the opportunity to become proficient in producing quality roentgenograms of the teeth and mandible.

AHS 261 RADIOGRAPHIC TECHNIQUE II (2)

A continuation of AHS 163 to the more advanced principles of the factors affecting radiographic exposure.

AHS 262 POSITIONING IN RADIOGRAPHY II (3)

A continuation of AHS 166 with emphasis on the digestive system.

AHS 263 RADIATION THERAPY AND NUCLEAR MEDICINE TECHNIQUE (2

This course is a consolidation of radiation therapy and nuclear medicine techniques. The student is introduced to the fundamentals of radiation therapy and the fundamental principles of physics and chemistry as applied to radioisotope technology.

AHS 264 PEDIATRIC RADIOGRAPHY (1

Through lecture and demonstration, the student is acquainted with the special requirements of pediatric radiography with emphasis on exposure factors and immobilization. Clinical experience will afford the student the opportunity to become acquainted with the special problems encountered in this particular field of radiography.

AHS 265 ADVANCED POSITIONING IN RADIOGRAPHY (3

Through the application of knowledge in previous courses, the student progresses to the more complex radiographic positioning. Special emphasis is placed on neuroradiographic and special procedures involving contrast media.

AHS 266 ADVANCED TECHNIQUE IN RADIOGRAPHY (3)

The student applies knowledge gained in previous courses to the more complex radiographic procedures. The student's clinical experience will be supported by a critical evaluation of the finished roentgenograms.

AHS 267 NURSING ESSENTIALS AND MEDICAL TERMINOLOGY PERTAINING TO ALLIED HEALTH (2)

This is a course which serves to introduce the student to nursing essentials which are required in caring for patients during radiographic procedures. Part of the course is devoted to a thorough introduction to medical terminology. This will enable a student to function effectively as a member of the paramedical team.

AHS 268 RESEARCH, NUCLEAR MEDICINE, THERAPY OR DIAGNOSTIC RADIOLOGY (3)

This course is designed to introduce the student to the basic concept of scientific research as related to radiologic technology. Time allowed for clinical experience will enable the student to observe and actively participate in research projects.

DETAILED OUTLINE
ALLIED HEALTH COURSES

AHS 146 3 Credit Hours 48 Lecture Hours

ELECTRICITY AND MAGNETISM

Purpose: Central Objective:
To understand the field of science which deals with the fundamentals of x-ray phenomenon

Contributory Objectives:

1. To introduce the branch of science which deals with electrostatics and electrodynamics
2. To understand the physical concept of energy
3. To analyze the fundamental structure of matter
4. To develop an understanding of the science of magnetism which influences almost every field of activity
5. To explain the magnetic phenomenon which are associated with electric currents
6. To understand the principle of the electric generator and current produced.

Placement: 1st semester

Teaching Facilities: Lectures
Discussions
Reference library in x-ray department
Visual Aids - blackboard illustrations, posters, films, x-ray circuit board

Method of Evaluation: Tests, Quizzes, Assignments

AHS 163 3 Credit Hours 48 Lecture Hours

RADIOGRAPHIC TECHNIQUE I

Purpose: Central Objective:

To master principles of radiographic techniques so as to apply this knowledge to x-ray work in a clearer understanding of the principles of physics, conversion of radiographic distances, the determining of film coverage at various size cones, use of grids and to corrolate this knowledge with practical applications.

Contributory Objectives:

1. Review primary principles of basic mathematics and algebra so as to apply this knowledge in the formation used in x-ray work
2. Acquire a sound knowledge of the terms used to describe the quality of a roentgenogram
3. Introduce the accessories used in the radiographic room.

Placement: First year - 1st semester

Teaching Facilities: Well equipped x-ray lab
Reference library
Visual aids - posters, accessories used in radiographic department, blackboard illustrations, films

Method of Teaching: Lectures
Demonstrations
Visual Aids
Discussion
Reference reading
Quizzes and examinations

Method of Evaluation: Quizzes
Examination
Bibliography reference

AHS 164 TOPOGRAPHIC ANATOMY AND PHYSIOLOGY

3 Credit Hours 48 Lecture Hours

AHS 267 NURSING ESSENTIALS AND MEDICAL TERMONOLOGY PERTAINING TO ALLIED HEALTH

2 Credit Hours 32 Lecture Hours

TOTAL of 5 Credit Hours and 80 Lecture Hours

Placement: First year - 1st and 2nd semesters

Teaching Facilities: Skeleton, loose bones, charts, diagrams, physiological structures, blackboard illustrations, films and slides

Methods of Training: Lectures, Visual Aids, Discussions, Reference reading, Quizzes, and Examinations

Methods of Evaluation: Quizzes
Examinations
Bibliography references

Central Objectives: The purpose of this course in Topographic Anatomy, Physiology for the student of radiologic technology is the acquisition of a basic knowledge and understanding of the structure and functions of the human body as a whole and of the various parts. To master medial terminology common to the speciality of radiography. To become acquainted with nursing procedures which may be performed for patient while in the x-ray department.

Contributory Objectives:

1. To acquire a knowledge and understanding of the overall anatomic structures and the terms commonly used in relation to human anatomy.
2. To arrive at a knowledge and understanding of the structure and function of a living cell.

3. To acquire a knowledge of the major divisions and cavities of the human body.

4. To arrive at a knowledge and understanding of the structure and function of the various systems of the human body - the integumentary, musculo-skeletal, respiratory, circulatory gastro-intestinal, endocrine, genito-urinary, reproductive and nervous; and the structure and function of the eye, ear, nose and throat.

AHS 165 1 Credit Hour 16 Lecture Hours

RADIATION PROTECTION

Placement: First year - 1st semester

Teaching Facilities: Well equipped x-ray department providing protective measures to be used in an ordinary radiology department
Reference library
Visual Aids, i.e., posters, accessories used in department

Method of Teaching: Lectures
Visual aids, charts, blackboard, illustrations, accessories
Discussions
Reference library
Quizzes and examinations

Central Objective: To provide maximum safety to patients and personnel.

To recognize the dangers which are present in an ordinary radiographic department and to observe the principles of protection which are deemed necessary.

Contributory Objectives:

1. To become familiar with the terminology common to radiation protection
2. To understand throughly the total patient permissable dosage and calculation of same
3. To be aware of the responsibility of safe operation of the x-ray equipment.

AHS 166 2 Credit Hours 32 Lecture Hours

POSITIONING IN RADIOGRAPHY I

Purpose: Central Objective:
To acquire skill in positioning various parts of the body.

Contributory Objectives:

1. To learn positioning of the basic routine views of the upper extremity.
2. To learn positioning of the basic routine views of the lower extremity.
3. To acquire knowledge of the nomenclature of positioning in respect to the planes of the body.
4. To learn positioning of the basic routine views of the pelvic girdle, shoulder girdle, and vertebral column.
5. To learn positioning of the Bony Thorax (sternum and ribs) in obtaining the basic routine views along with Thoracic contents.
6. To learn derivation of Latin and Greek terms.

Placement: First year - 1st semester

Teaching Facilities: Well-equipped lab

Method of Teaching: Lectures
Demonstration
Visual Aids
Phantom

Methods of Evaluation: Lab reports shown on films produced by the students as to position of part and its relationship in respect to c/r, film and structure required
Quizzes
Demonstrations by students under direction of instructor.

AHS 167 2 Credit Hours 32 Lecture Hours

RADIOLOGIC PHYSICS

Purpose: Central Objective:

To understand the field of science which deals with the fundamentals of x-ray phenomenon

Contributory Objectives:

1. To understand the principles of x-ray generation and the biological effects of radiation
2. To study the various tubes and auxiliary devices necessary for proper operation of x-ray equipment

Placement: First year - 1st and 2nd semester

Teaching Facilities: Discussions
Reference library in x-ray department
Visual aids - blackboard illustrations, posters, films, x-ray circuit board

Method of Evaluation: Tests, Quizzes
Assignments
Posters
Bibliographies

AHS 168 2 Credit Hours 32 Lecture Hours

BASIC ELEMENTS OF RADIOLOGIC TECHNOLOGY AND DARKROOM CHEMISTRY

Purpose: Central Objective:

Develop the knowledge and skills necessary for thorough and efficient darkroom procedure with emphasis on newer automatic processes. Maintenance and care of screens and cassettes. Knowledge of the chemical constitutents of processing solutions for both wet and automatic processing. Maintenance of automatic processor film critique for fog safelight artifact.

Contributory Objectives:

1. To study the history and development of x-ray film, darkroom, cardboard holders and screens
2. To gain a thorough knowledge of the chemical constituents of processing solutions for both manual and automatic processing and their functions.
3. To appreciate various types of darkroom and processing apparatus
4. To cultivate an interest in recognizing artifacts on films and the means of avoiding them
5. To understand the principle and the uses of the various types of film used in the x-ray and surgery departments.

Placement: First year - 1st semester

Teaching Facilities: Well equipped lab with x-ray tube
Darkroom for both wet and automatic processing
Reference library in x-ray training school
Visual aids--i.e., posters, accessories used in darkroom, blackboard illustrations and films

Method of Teaching: Lectures
Demonstrations
Visual aids, charts, blackboard, accessories used, films
Discussion
Reference

Methods of Evaluation: Quizzes
Examination
Bibliography references

AHS 260 1 Credit Hour 16 Lecture Hours

INTRODUCTION TO ORAL RADIOGRAPHY

Purpose: Central Objective:

To present positioning of dental structures and proper angulations for dental radiography.

To provide the student with an understanding of the anatomy and contours of the teeth and mouth and of the geometry of image formation of this area. To familiarize and to point out the necessity of exact positioning of the central ray and the film in order to produce high quality radiographs.

Contributory Objectives:

1. To study dental anatomy, including landmarks used for radiography
2. To provide practice in dental radiography so that examination can be made with accuracy and ease.

Placement: Second year - 1st semester

Teaching Facilities: Well equipped x-ray lab with practice in the clinical and hospital area

Methods of Teaching: Lecture
Demonstration
Re-positioning
Visual aids

Method of Evaluation: Re-positioning

AHS 261 3 Credit Hours 48 Lecture Hours

RADIOGRAPHIC TECHNIQUE II

Purpose: Central Objective:

Continuation of AHE 163 to the more advanced principles of the factors affecting radiographic exposure.

To give the student a complete and thorough working knowledge of the manipulation of exposure factors through the completion of problems and experiments.

Contributory Objectives:

1. To learn basic principles needed to construct technique charts for all situations and all kilovoltage ranges
2. To study the effects of x-rays on photographic film

Placement: Second year - 1st semester

Teaching Facilities: Well equipped x-ray teaching lab providing practical experience

Method of Teaching:
Lectures
Demonstrations
Visual Aids
Discussions
Quizzes

Method of Evaluation:
Quizzes
Examinations

AHS 262 3 Credit Hours 48 Lecture Hours

POSITIONING IN RADIOGRAPHY II

Purpose: Central Objectives:

1. To arouse interest and enthusiasm in doing some of the more difficult procedures which are specialities.
2. To present the opaque media used for various studies, discussing the reactions and contra indications.
3. To become aware of the technician's role in routine special procedures done in the radiographic department.

Placement: First-First and Second year students

Teaching Facilities: Well equipped x-ray lab providing practical experience in many of the routine special procedures.
Reference library in x-ray training school
Visual aids in posters, accessories used in special procedures
Blackboard illustrations
Films

Method of Teaching: Lectures
Demonstrations
Visual Aids
Discussion
Reference reading
Quizzes and examinations

Methods of Evaluation: Quizzes
Examinations
Bibliography reference

AHS 263 2 Credit Hours 32 Lecture Hours

RADIATION THERAPY AND NUCLEAR MEDICINE TECHNIQUE

Placement: Second year - 2nd semester

Teaching Facilities: Well equipped deep and superficial therapy department

Method of Teaching: Lectures
Discussion

NOTE: Besides normal classroom lecture by instructor, this block is presented by the staff Radiologists during the course with guest lectures in this field.

Method of Evaluation: Quiz

Central Objective: This course is designed to meet the basic requirements for technologists in radiology, dealing with therapy in radiation. It is slanted toward the student whose training is primarily in the field of diagnostic X-ray technology but whose subsequent employment may include duties in radiation therapy.

Contributory Objective: To understand the physical aspects of radiation therapy.

Method of Evaluation: Quiz

AHS 264 1 Credit Hour 16 Lecture Hours

PEDIATRIC RADIOGRAPHY

Purpose: Central Objective:
To master the more complicated area of radiography--Pediatric Radiography

Contributory Objectives:

1. To arouse interest and enthusiasm in doing pediatric radiography.
2. To become better acquainted with the method of handling little patients and producing exacting radiographs.
3. To better understand the psychological problems facing little ones coming into the department.
4. To arouse an awareness of the need of protective measures used on children during all procedures.

Placement: Second year - 1st semester

Teaching Facilities: Classroom
Library, Radiographic room with protection and immobilization devices

Method of Training: Lectures
Demonstration
Visual Aids
Discussions

Method of Evaluation: Quizzes
Examinations

AHS 265 3 Credit Hours 48 Lecture Hours

ADVANCED POSITIONING IN RADIOGRAPHY

Purpose: Central Objectives:

1. To arouse interest and enthusiasm in doing some of the more difficult procedures of the skull

2. To become better acquainted with the technical terms and various positions met in skull procedures

3. To become efficient in the use of landmarks, angle boards and various cones needed to produce the best diagnostic radiograph.

Placement: Second year - 1st semester

Teaching Facilities: Well equipped x-ray lab
Reference library
Posters
Cones
Angle indicators

Method of Teaching: Lectures
Discussion
Positioning of phantom patient

Method of Evaluation: Quizzes
Test

INSTRUCTIONS TO APPLICANTS FOR ADMISSION TO CENTER FOR LEARNING RESOURCES FOR ALLIED HEALTH

(Kellogg Project)

COLLEGE OF ALLIED HEALTH PROFESSIONS

* *

BACHELOR OF HEALTH SCIENCE DEGREE

The University of Kentucky, working in part under a grant from the W.K. Kellogg Foundation, formed the Center for Learning Resources for Allied Health to prepare graduates of two-year Associate Degree programs in the allied health technologies who desire to teach in or administer programs of their specialties.

ELIGIBILITY FOR ADMISSION

1. Applicants must be graduates of a program approved by the appropriate allied health accrediting agency. Applicants must possess an Associate Degree or its equivalent as determined by achievement on proficiency and/or equivalency examinations acceptable to the University.
2. The applicant must have achieved a Grade Point Average (GPA) of at least 2.0 on a 4.0 quality point scale in all prior course work attempted. An official transcript from each college attended must be submitted.
3. The applicant must have completed a minimum of one year of acceptable clinical experience in his allied health discipline.

ADMISSION PROCEDURE

Applicants desiring to be considered for admission to the Baccalaureate (2 + 2) program must complete the Admission Procedure including all necessary forms as indicated on the following page:

A. The Professional Application form and U.K. Admission form must be completed and returned by January 1.
(August 1 for admission to Spring session) to:

- Office of Admissions
- Administration Annex
- University of Kentucky
- Lexington, Kentucky 40506

B. All additional materials and supporting documents must be returned not later than FEBRUARY 15 (September 15 for admission to Spring session) to:

- Office of Admissions
- Administration Annex
- University of Kentucky
- Lexington, Kentucky 40506

THESE MATERIALS AND DOCUMENTS SHALL CONSIST OF THE FOLLOWING:

(1) Official transcripts from each institution in which you have enrolled since graduation from High School. You must contact each College and request that these transcripts be sent to the above address.

(2) Recommendation forms from the Director of your professional program at the institution where such work was completed, and at least two other professional references.

NOTE: APPLICANTS ARE ENCOURAGED TO SUBMIT MATERIALS EARLY. FAILURE TO PROVIDE REQUIRED INFORMATION BY THE DATES INDICATED WILL RESULT IN THE CANCELLATION OF YOUR APPLICATION!

NOTIFICATION

All applicants will be notified of their acceptance or non-acceptance by the Dean of the College of Allied Health Professions. The Admissions Committee may request a personal interview with applicants prior to final selection of students.

GRADUATION REQUIREMENTS - BACHELOR OF HEALTH SCIENCE (2 + 2) OPTION

The graduate of a typical associate degree program will have had approximately one-half of his post-secondary education in Arts and Sciences and one-half in his Allied Health specialty. This curriculum will allow the graduate of such a program to take two additional years of a combination of (1) courses related to his Allied Health program, (2) courses designed for the teacher or administrator of an Allied Health program, (3) Arts and Science courses necessary to satisfy the requirement of the University for completion of five general studies areas. Details of the specific courses required in each of the areas mentioned above will be provided the student in his academic advising conferences with the Coordinator of his program.

Students who may have attended other institutions than the one in which the Associate Degree was earned should be advised that the possibility of a limitation of 67 credit hours of transfer credit may be applied in accordance with current academic regulations of the University. An official evaluation of transfer credit will be made at the time of admission to the baccalaureate program.

Upon completion of the following requirements the student will be awarded the degree of Bachelor of Health Science:

1. Minimum of 120 semester credit hours.
2. Minimum Grade Point Average of 2.0 on all work attempted.
3. Completion of General Studies requirement of the University.
4. Completion of Upper Division Core requirements.
5. Completion of Education or Administration option requirements.
6. Completion of residence requirement of the University, i.e., 30 of the last 36 hours presented for the undergraduate degree must be completed on the main campus of the University.
7. Evidence of professional competence as recognized by satisfactory achievement of Licensure, Registration, or Certification as appropriate to the student's allied health specialty.

CURRICULUM FOR BACHELOR OF SCIENCE IN RADIOLOGIC TECHNOLOGY

UNIVERSITY OF TENNESSEE

JUNIOR YEAR

First Quarter (Fall)

Course			Hours
1225	420	Fundamentals of Radiological Physics I with Lab	4
1225	422	Health Service Organization and Administration	4
1225	429	Radiological Science Seminar I	1
1225	426	History & Philosophy of Radiological Sciences	3
			12

Second Quarter (Winter)

1225	430	Fundamentals of Radiological Physics II with Lab	4
0412	432	Gross Anatomy with Lab	4
1225	439	Radiological Science Seminar II	1
1225	428	Educational Psychology	4
1225	440	Radiobiology	3
			16

Third Quarter (Spring)

0408	438	Pathology	3
0412	443	Radiological Anatomy	3
1225	448	Introduction to Computer Programming with Lab	4
1225	449	Radiological Science Seminar III	1
0410	442	Physiology	5
			16

SENIOR YEAR

Fourth Quarter (Fall)

Course			Hours
1225	520	Physics and Imaging of Diagnostic Radiology	5
1225	529	Radiological Science Seminar IV	1
1225	528	Patient Care and Psychology	3
		Areas of Selected Emphasis	7
			16

Fifth Quarter (Winter)

1225	531	Clinical Health Science	4
1225	539	Radiological Science Seminar V	1
1225	535	Independent Study I	3
		Areas of Selected Emphasis	8
			16

Sixth Quarter (Spring)

1225	540	Radiological Health and Ecology	3
1225	542	Community Medicine	3
1225	546	Independent Study II	3
1225	549	Radiological Science Seminar VI	1
		Areas of Selected Emphasis	6
			16

AREAS OF SELECTED EMPHASIS

Education

Course			Hours
0605	527	Multimedia in Communication	3
1225	528	Educational Measurements	4
1225	534	Methods and Practices of Rad. Instruction II	5
1225	544	Methods and Practices of Rad. Instruction II	5

Administration

Course			Hours
1215	532	Organization & Administration of Health Care Facilities	2
1225	530	Quantitative Methods in Hospital Management	3
1225	548	Radiological Department Management	3
1215	523	Organization and Administration I	3
1215	533	Organization and Administration II	3
1215	543	Personnel Management	3

Cardiovascular and Special Procedures

1225	538	Neuroradiography	3
1225	545	Cardioradiography	3
1225	535	Peripheral and Visceral Angiography	3
1225	512	Physiologic Monitoring and Patient Care	3
1225	521	Equipment and Instrumentation	3
1225	537	Cardiovascular Clinic, Assignment I	1
1225	547	Cardiovascular Clinic, Assignment II	1

SECTION III ARTICULATION FOR OPERATING ROOM TECHNOLOGY PROGRAMS

Chapter 1

INTRODUCTION

ARTICULATION FOR OPERATING ROOM TECHNOLOGY PROGRAMS

Overview of the Profession

The Operating Room Technician's function in association with nurses and surgeons is to help provide the best possible care to the surgical patient. The technician is part of the operating room team responsible for cleanliness, safety, and efficiency of the operating room; and his or her knowledge of and experience with surgical technique qualify him or her to prepare materials for use and to assist with their use in the operating room.

Operating Room Technicians are usually employed by hospitals and function under the direction of the operating room supervisor who is a Registered Nurse. They may become highly trained and specialized in the areas in which they are adept or may be required to be knowledgeable in a wide variety of operative procedures depending on the needs of the hospital. The high degree of responsibility expected of O.R.T.'s requires that at completion of formal education, they possess the knowledge, skills, and abilities necessary to provide services appropriate in the operating room.

The Council on Medical Education of the American Medical Association collaborates with the following organizations in the review and approval of educational programs in operating room technology: American College of Surgeons, American Hospital Association, Association of Operating Room Nurses, and Association of Operating Room Technicians.

The Operating Room Technician training is generally provided in a vocational-hospital school setting and is usually a one-year program. After graduation, the student is eligible to take the National Certification Examination, thus becoming a Certified Operating Room Technician (C.O.R.T.). The C.O.R.T. must meet rigid professional requirements including re-certification every two years, attend 30 hours of workshop and three local association meetings each year.

Nature of the Study

The purpose of this model is to explore the channels of career mobility and possibilities of developing a career laddj r from the O.R.T. program to other related fields of study. At present, the O.R.T. training program is a terminal degree program providing for minimum career mobility through the State vocational or University system. Thus, no direct credit is given for technical expertise acquired by certificate training in, for example, the two-year R.N. program conducted by the State's community colleges.

The methodology used in the development of this project includes an accurate survey of the vocational curriculum and level of instruction of the Madisonville State Vocational-Technical School Health Occupations Annex's Operating Room Technician program to establish whether articulation is possible. The next step in this case study will be to determine whether articulation (from the vocational to the university setting) is desirable and to recommend alternative courses of action to enhance career mobility in the Operating Room Technician profession.

Chapter 2

DESCRIPTION OF THE MADISONVILLE PROGRAM

ARTICULATION FOR OPERATING ROOM TECHNOLOGY PROGRAMS

The Operating Room Technician program offered at the Madisonville State Vocational-Technical School Health Occupations Annex is under the direction of Mary Margaret Drury, R.N., Operating Room Supervisor of Hopkins County Hospital. The program is nationally accredited by the Council on Medical Education in collaboration with the Association of Operating Room Technicians and other professional organizations.

Organization and Admissions

The Madisonville program has an affiliation agreement with the local hospital (Hopkins County) to provide the student with actual clinical training. Approximately 775 hours of the 1,245 hour program are spent in clinical practice. The school is approved for 10 students in each eleven-month class. Students are admitted based on high school performance and a personal interview with the admissions committee. Applicants are required to be in good health.

Faculty

In addition to the Director of the program who conducts lectures and gives formal clinical supervision, one full-time instructor is involved in the program at Madisonville, serving as the education coordinator. In addition, approximately twenty physicians, many of whom are from the Trover Clinic, give lectures to the student O.R.T. during the third quarter of their rotation.

Instruction and Licensure

Methods of instruction include classroom presentations and demonstrations made by the instructor, as well as formal lectures conducted by physicians; clinical experience in the hospital; the use of audio-visual aids, film strips, etc.; field trips; and conferences. The first eight weeks of instruction are spent in the classroom learning basic sciences, patient care and safety, principles of technique, surgical procedures, and other hospital activities. Laboratory experience for the student begins in the classroom laboratory where knowledge of basic procedures are required.

The remaining weeks in the 11-month program are spent in the clinical setting supervised by the program director. The O.R.T. student spends one week in each of seven services, repeating the rotation three times.

After receiving a certificate of graduation, the student is eligible to take the National Certification Examination offered by the Association of Operating Room Technicians.

Course Information

As stated earlier, the classroom training gives the student the theoretical background from which the clinical experience becomes more meaningful. An outline of the curriculum and a list of associated textbooks are found below:

TABLE 3-1
MADISONVILLE OPERATING ROOM TECHNOLOGY CURRICULUM

Theory

Unit I INTRODUCTION AND ORIENTATION — 40 hours
- A. Brief History of Surgery
- B. Environmental Orientation
- C. Terminology
- D. Units of Weights and Measures
- E. Ethical, Moral and Legal Responsibilities
- F. First Aid

Unit II BASIC SCIENCES — 52 hours
- A. Anatomy
    - a. The Human Body
    - b. The Integumentary System
    - c. The Skeletal System
    - d. The Muscular System
    - e. The Nervous System
    - f. The Digestive System
    - g. Properties of Blood
    - h. Circulatory System
    - i. The Urinary System and the Male Reproductive System
    - j. The Female Reproductive System
    - k. Respiratory System
    - l. The Special Sense Organs
    - m. Endocrine System
    - n. Fundamentals of Fluid and Electrolyte Balance

- B. Introductory Microbiology — 50 hours
    - a. The Evolution of Asepsis
    - b. The Physiology of Injury and Wound Healing
    - c. The Process of Infaction
    - d. Prevention and Control of Infection
    - e. Sterilization and Disinfection
    - f. Preparation and Care of Supplies for Surgery

Unit III CARE AND SAFETY OF THE PATIENT DURING SURGERY — 40 hours
- A. The Surgical Patient
- B. Surgical Preparation of the Skin
- C. Transportation of the Surgical Patient
- D. Anesthesia
- E. Positioning the Patient and the Surgical Table

Unit IV PRINCIPLES OF OPERATING ROOM TECHNIQUE 110 hours

A. The Surgical Hand Scrub
B. Gowning and Gloving
C. General Principles of Aseptic Technic
D. Draping the Operative Field
E. Specimens, Care of
F. Suture Material
G. Needles
H. Sponges and Dressings
I. Drains
J. Instruments
K. Duties of the Circulating Technician
L. Duties of the Scrub Technician
M. Septic Case Technic

Unit V SURGICAL PROCEDURES 121 hours

A. Abdominal Incisions: Wound Closures
B. General Surgery (hernia, breast, vein, rectal, pilonoidal)
C. General Abdominal Operations
D. Thyroid and Parathyroid Glands
E. Gynecology and Obstetrics
F. Thoracic Surgery
G. Genitourinary System
H. Orthopedic Surgery
I. Plaster Room Technic
J. Ear, Nose and Throat Operations
K. Opthalmic Surgery
L. Diagnostic Procedures
M. Classification, Complications, Treatment of Burns
N. Plastic and Reconstructive Surgery
O. Pediatric and Geriatric Surgery
P. Neurosurgery
Q. Cardiovascular Surgery
R. Radiation Therapy

Unit VI COORDINATED HOSPITAL ACTIVITIES 58 hours

A. Related Nursing Procedures
B. Special Instruments and Equipment
C. Emergency Room Care
D. Delivery of Newborn Infant

Theory Total **471 hours**

Clinical Experience

Bacteriology (includes CS–X-Ray–E.R.) **774.5 hours**
Related Procedures (nursing)
Operating Room Tech. Arts
Surgical Procedures

Clinical and Theory Total **1245.5 hours**

Textbooks:

Care of the Patient in Surgery Including Techniques, by Alexander, Burley, Ellison, Vallari, 5th edition if available; if unable to get 5th edition, we will use 4th edition, 1967.

Introduction to Operating Room Technique, Berry and Kohn, 3rd edition, 1966.

Operating Room Technology, Ginsburg, F., Brunner and Cantlin, 1966, Anthony.

Instructional Materials:

Standard First Aid and Personal Safety
(Red Cross) and workbook

A Manual of Operating Room Technology
(Ginsburg, Brunner and Cantlin)

Introduction to Operating Room Technique
Berry and Kohn/4th edition

Structure and Function of the Body Anatomy/4th edition

Additional Reading:

Alexander's Care of the Patient in Surgery
Ballinger, Treybol and Vose/5th edition.

Evaluation and Follow-Up

Students in the O.R.T. program are evaluated after completion of each course unit of their classroom work and every six weeks thereafter for their performance in the clinical setting. Evaluations are problem-oriented, seeking to identify and relay to students where their shortcomings or weaknesses lie.

Following graduation, follow-up letters are mailed to students who have been in the O.R.T. program regarding information such as the availability of jobs, if they are employed in the field or related field, and if they were satisfied with their instruction. Responses have indicated that 17 of the 19 students responding to questionnaires in the 1973 and 1974 classes were employed. Thus, job opportunities seem favorable. In addition, of the 12 students working in the O.R.T. or related field, 50 per cent felt that advancement possibilities were favorable and four persons were continuing their education at local community colleges.

Summary

The philosophy of the Operating Room Technician program is to train high quality, well-trained technicians who will be able to perform specific functions in an operating room. Since the American Medical Association has approved the program through rigidly established criteria, the quality of education should not be a topic of discussion. Yet, it is noteworthy that the school surpasses the general A.M.A. curriculum and technical requirements, has a highly capable staff, and adequate clinical facilities.

The follow-up survey reports that many past students are seeking advanced education opportunities and job mobility. The ease by which these students can obtain mobility shall be the subject of Chapter 3.

Chapter 3

THE MODEL OR ALTERNATIVES

ARTICULATION FOR OPERATING ROOM TECHNOLOGY PROGRAMS

A survey of the National Association of Operating Room Technicians finds that there are very few direct channels nationally for articulation or credit transfer from the O.R.T. training to an associate or baccalaureate degree program. There are less than five associate degree programs in the country and, at least one is being phased out by 1977. As indicated in Chapter 2, much of the training of the O.R.T. is technically rather than academically oriented. Thus, the academic qualifications of the technician are surpassed by his or her abilities in the clinical area. Because of this, the establishment of a means of direct credit transfer to the University is not seen as optimal, in itself, for the student or the institution. O.R.T.'s with associate degrees are, in reality, no better off than the certified person, for unlike the Radiologic Technologist, they cannot assume a supervisory or administrative position due to the fact that they are supervised by a Registered Nurse. Nevertheless, Operating Room Technicians desiring to obtain a higher level position do have various channels presently open to them by which they can proceed, while at the same time not duplicating or wasting their past training.

The career ladder for the O.R.T. can be directed in one of two channels. Depending on the personal goals of students, they can proceed into the R.N. program or an advanced hospital or physician training program. Any student accepted into an associate degree R.N. program in Kentucky can, through passage of a challenge examination, receive up to sixteen hours credit in nursing courses and may, through the College Level Entrance Program Examination (C.L.E.P.), obtain even more credit hours based on their proficiency of course material. O.R.T.s, with some preparation, could legitimately gain, at least, a semester's credit for their technical training if they were capable of challenging basic nursing course work. This channel could result in an associate and/or subsequent bachelor's degree in nursing.[1]

A second channel for the O.R.T. is an advanced training program to become surgical assistant, free-lance technician, urology technician, etc. These experiences are usually training programs conducted by hospitals or physicians on an individual basis. Though the student O.R.T. could be limited by the hospital's degree of specialization and/or the physician's needs, an ambitious and qualified O.R.T. should have little difficulty obtaining advanced levels of proficiency and specialization if he or she so desires.[2]

Based on this discussion, it is believed that adequate channels for advancement are available to the Operating Room Technician both in the areas of academic and technical training. Though articulation from a vocational program to a University program is limited to the R.N. profession and to the student's ability to challenge course work, this is considered to be a reasonable limitation based on the limited academic instruction received in the O.R.T. training.

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[1] Both Western and University of Kentucky have or are working on the development of a 2 + 2 program giving the student automatic credit for associate degree work when applied to a Bachelor of Science in Nursing.

[2] This assumption is based on conversations with representatives of the A.O.R.T. and the follow-up reports of the Madisonville State Vocational-Technical School which indicated that six (6) out of 12 past students in the operating room field felt that advancement opportunities were favorable.

Chapter 4

DISSEMINATION AND EVALUATION

ARTICULATION FOR OPERATING ROOM TECHNOLOGY PROGRAMS

As explained in Chapter 3, no model has been developed in the sense of an innovative alternative for student Operating Room Technicians. Nevertheless, the existing occupational structure does inherently provide a "model" in that there are "built in" mechanisms by which persons can achieve career advancement in many situations. The qualified O.R.T. can, through specifically designed hospital training programs, become highly specialized, if physicians or hospitals have such needs for highly trained personnel. Most of these advancements are based on individual expertise and occupational goals. In addition, the O.R.T. can challenge up to 16 credit hours in nursing in the community college associate degree nursing programs once they are admitted into the program.

One aspect of career mobility in the O.R.T. profession is that it is largely done on an individual basis rather than through an established channel for all interested individuals. This may result in many technicians being unaware of articulation mechanisms, particularly of the availability of challenge exams for first-year nursing courses in the R.N. Associate degree program. For this reason, it is recommended that the Bureau of Vocational Education in cooperation with the hospitals involved with the O.R.T. training programs in Kentucky, disseminate information on career ladders which exist in the operating room profession to student technicians and technicians in the field. In this manner, the "terminal" degree O.R.T. program becomes a program which is by no means terminal.

Finally, these career ladders can be evaluated, rather simply, based on a review of the number of O.R.T.'s entering R.N. programs, those challenging the Registered Nursing courses and follow-ups, such as Madisonville's, to determine if advancement opportunities exist in field training and specialized work experience.

Chapter 1

INTRODUCTION

ARTICULATION FOR RESPIRATORY THERAPY TECHNOLOGY PROGRAMS

Overview of the Profession

Respiratory therapy is a clinical specialty involving preventative and rehabilitative techniques and procedures as well as those often essential in maintaining life in seriously ill patients with respiratory problems. The field is divided into two levels of expertise: the Respiratory Therapy Technician and the Respiratory Therapist. Both perform designated duties under the direction of a qualified physician. The technician has generally completed a one year technical program usually based in a vocational school or hospital setting. A description of the Respiratory Therapy Technician's responsibilities is outlined below:

> The Respiratory Therapy Technician will be able to administer gas therapy, humidity therapy, aerosol therapy, and intermittent positive pressure breathing treatments. He should be able to assist with long term continuous artificial ventilation, special therapeutic procedures and cardiopulmonary resuscitation. He will be capable of administering drugs which are given through inhalation procedures. Further, he will be able to perform tasks related to patient care, especially those of airway management, while he is involved in giving respiratory therapy. The Respiratory Therapy Technician will be trained to clean, sterilize and generally maintain respiratory therapy equipment. He will be expected to keep adequate and accurate records of patients' therapy and such other department records as may be required.[1]

The Respiratory Therapist training is generally received in a two or four-year university-based program with greater emphasis on Anatomy, Physiology, Pharmacology and Clinical Medicine. The Respiratory Therapist is capable of performing all tasks described above. The therapist is expected to exercise more judgment and accept greater responsibility in therapeutic procedures based on observation of patients. In addition, more specialized roles in education, administration, diagnostic technique and/or supervision are open to the therapist.

Both the technician and therapist, upon completion of an AMA approved program are qualified to sit for their respective national registry or certification examinations. The exams are prepared by the American Registry of Inhalation Therapists (A.R.I.T.) for Registered Therapists and the American Association of Inhalation Therapy (A.A.I.T.) for the technician's certification.

At present, the Respiratory Therapy Technician program is a terminal degree providing for minimal career mobility. Very few links between the certified technician and the registered therapist exist whereby permitting the technician to become a therapist without starting from the beginning of the therapist program. Thus, no credit is given for technical expertise acquired by certificate training. However, the problem of a lack of career mobility has been explored by the A.A.I.T. and they will be voting this year on a referendum which would permit the certified technician with three or more years experience and 62 academic credit hours to sit for the registry examination. Thus, it appears that the problems of developing a career ladder in the Respiratory Therapy field may soon be partially resolved.

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[1] *Guidebook for Respiratory Therapy Educational Program Development Including Essentials for Approval*. Joint Review Committee for Inhalation Therapy Education. June, 1972.

Nature of the Study

The purpose of this model is to explore the channels of career mobility and the possibilities of developing a career ladder in Respiratory Therapy in light of the A.A.I.T.'s eventual action. The model will explore the feasibility and desirabilty of developing formal linkages between the vocational school and the State university-community college system for the purpose of credit transfer. The model should be applicable throughout the state, affecting all approved Respiratory Technician and Therapy programs and State universities.

The methodology used in the development of this project includes an accurate survey of the vocational curriculum and level of instruction of Madisonville's certified Respiratory Therapy Technician program to establish if articulation is possible. The next step in the case study will be to develop the criteria necessary to articulate from the vocational program or to recommend alternative courses of action to enhance career mobility for the Respiratory Therapy Technician. The model shall be developed in a manner in which the integrity of both the Madisonville certificate programs and the university registry programs is maintained, and a way which offers maximum opportunity to the student.

Chapter 2

DESCRIPTION OF THE MADISONVILLE PROGRAM

ARTICULATION FOR RESPIRATORY THERAPY TECHNOLOGY PROGRAMS

The Certified Respiratory Therapy Technician program offered at the Madisonville State Vocational-Technical School Health Occupations Annex is under the direction of Dr. Thomas Gallo, M.D. of Madisonville, Kentucky. National accreditation by the Joint Review Committee for Inhalation Therapy Education is being sought for the program which has been tentatively approved by a formal letter of support from the Council on Medical Education American Medical Association. The program is in compliance with "essential" criteria established by the American Association for Inhalation Therapy (A.A.I.T.) and accreditation is anticipated by the fall of 1976.

Organization and Admissions

The Madisonville program has clinical affiliation agreements with both Hopkins County Hospital, Madisonville, and Community Methodist Hospital, Henderson. During the clinical affiliation period, each student is assigned to a staff technician on a rotating one-to-one basis.

The Respiratory Therapy Technician program is approved for ten students. Candidates for admission to the program must be high school graduates in good health, and have favorable recommendations and interviews. Selection into the program is based on evaluation of the above criteria by the selection committee which includes the program coordinator, medical director, clinical coordinator, assistant administrator of Hopkins County Hospital, the coordinator of the Health Occupations Annex of the Madisonville State Vocational-Technical School, and a student representative.

Instruction and Licensure

Lectures, audio-visual aids, films, guest lectures, and on-the job experience are the primary modes of instruction during the student's 11-month period of study. Use is also made of the bimonthly meetings of the Western Chapter of the Kentucky Society for Respiratory Therapy to further educate students. By attending these meetings, students are exposed to competent professionals in the field of respiratory therapy, and contacts are made for possible future employment.

The course consists of two phases, didactic and clinical. Primary didactic portion of the course is approximately 14-15 weeks in length. During this phase of training, the student is exposed to a variety of material directly related to Respiratory Therapy including: Introduction to the History of Respiratory Therapy, General Anatomy and Physiology, Cardio-Pulmonary Anatomy and Physiology, Respiratory Therapy Sciences (Chemistry, Physics, Mathematics), Microbiology, Pharmacology, Clinical Respiratory Medicine, Patient Care, Airway Management, Mechanical Ventilation, Gas and Humidity Therapy, Aerosol Therapy, Cardiopulmonary Resuscitation, and Chest Physiotherapy.

The clinical phase of the program consists of approximately seven months training in an AMA approved hospital or hospitals. As additional laboratory experience, the Health Occupations Annex clinical classrooms are utilized on a weekly basis to provide students with skills required before entering the actual clinical phase (hospital) of training. These experiences include proper handling of O_2 tanks or cylinders, cardiopulmonary resuscitative measures (using a mannequin), intermittent positive pressure, breathing, aerosol therapy, pharyngeal suctioning technique, O_2 therapy, and of course, background theory review of each aforementioned subject.

Upon satisfactory completion of the program, the student is declared "certificate eligible" and after one year of work experience may sit for the certification examination offered by the American Association of Inhalation Therapy (A.A.I.T.).

Course Outline

The primary purpose is to provide competent educational experiences in the area of Respiratory Therapy. The objectives are to give the student basic knowledge involving the preventive and rehabilitative techniques and procedures essential in maintaining life in seriously ill patients with respiratory problems.

As stated previously, the program is divided into two phases integrating didactic and clinical activities. The classroom training gives the student the theoretical background from which the clinical experience becomes more meaningful. An outline of the curriculum is found below:

TABLE 4-1
MADISONVILLE RESPIRATORY THERAPY
TECHNICIAN CURRICULUM

	Course Name	Clock Hours*	
		Didactic	Clinical
1.	Basic Anatomy & Physiology	100	100
2.	Cardio-Pulmonary Anatomy & Physiology	80	50
3.	Pharmacology	8	2
4.	Clinical Medicine	40	500
5.	Airway Management	40	40
6.	Manufacture, Transport & Storage of Gas	8	8
7.	Humidity-Therapy	20	20
8.	Aerosol Therapy	10	10
9.	Mechanical Ventilation	40	100
10.	Cardio-Pulmonary Resuscitation	25	25
11.	Chest Physiotherapy	8	8
12.	Microbiology	8	2
13.	Oxygen Administration	8	8
14.	Pulmonary Function Testing	15	15
15.	Sterilization	8	8
	Total	418	896

*Clock hours are estimates of actual hours spent in classroom and laboratory and should be interpreted as such, only estimates.

Textbooks used in the Certified Respiratory Therapy Technician Program include:

Principles and Practices of Inhalation Therapy, J. A. Young, D. Crocker.

Physiology of Respiration, Julius H. Comroe

Structure and Function of the Body, C. A. Parker

Textbook of Anatomy and Physiology, C. Anthony

Respiratory Therapy, Peter Safar

Respiratory Care, H. H. Bendixen, et al

Fundamentals of Respiratory Therapy, Donald Egan

Cardio-Pulmonary Resuscitation, Jude & Elam

Program and Student Evaluation

The program is evaluated periodically by the Joint Review Committee for Respiratory Therapy Education. The unified evaluation for the C.R.T.T. program will be in the summer or fall of 1976. The program is also evaluated by students twice during the academic year (one evaluation for didactic training and one evaluation for post-clinical training). Students are evaluated every six weeks by the instructor. Evaluation forms are kept on file as part of the student's permanent record and are available upon request. Students are evaluated twice monthly in the clinical affiliates by the clinical instructor, technicians and clinical coordinator.

Job Opportunities

Criteria for measuring graduate student success are successful or unsuccessful completion of certification by the National Board for Respiratory Therapy (NBRT) and contact with graduate student's supervisor, when possible. The job market for Respiratory Therapy Technicians is considered good to excellent for the State and good employment opportunities should exist (nationally) for at least ten more years according to several surveys by Allied Health Professions projects.

This program has graduated sixteen students to date. Approximately 80 per cent to 90 per cent of graduates are now employed in a Respiratory Therapy Department or areas related to Respiratory Therapy.

Chapter 3

THE MODEL

ARTICULATION FOR RESPIRATORY THERAPY TECHNOLOGY PROGRAMS

With the national accreditation of the Madisonville program by the Joint Review Committee on Inhalation Therapy Education anticipated for this fall, the Madisonville C.R.T.T. program will become the only approved program in the State. This accreditation expresses that the program is a quality program and that it maintains a certain standard of excellence required by the Council on Medical Education of the American Medical Association. Thus, the quality of this, or any approved C.R.T.T. program, is not an issue in the discussion of achieving an articulation vehicle by which the C.R.T.T. degree would be less than a terminal degree program.

Nevertheless, there are several difficulties found with the development of a model for the articulation of the Certified Technician to a higher degree level. Perhaps of most importance, the professional Respiratory Therapy organization will not decide for several months what their position is in allowing the C.R.T.T. with three year's experience to sit for the Registry examination. Until this referendum is acted upon, the discussion of a built-in laddering of the C.R.T.T. to the Respiratory Therapist program is a moot question.

Secondly, although the American Medical Association is encouraging the career ladder concept in the Respiratory Therapy profession, no mechanisms for facilitating this concept are operating in Kentucky at present. There are two approved Respiratory Therapy programs, both of which offer Associate of Science Degrees: Jefferson Community College (J.C.C.) in Louisville and the Lexington Technical Institute (L.T.I.) program offered in conjunction with the University of Kentucky Medical Center. At J.C.C. no credit is given for past technical training and the certified students seeking the associate degree must start from the beginning of the registry program. The L.T.I. program, approved for twenty students, permits Respiratory Therapy Technicians, on the basis of challenge performance, to fill any vacancies of the freshman class. In other words, credit for technical training is given only if a vacancy occurs (due to failure or dropping out of the program). The technician(s) scoring the highest on the challenge examination are admitted into the sophomore year of the program. The Director of the R.T. program at Lexington noted that with adequate staffing, qualified technicians could be laddered into the therapy program, but that a lack of funds make the career ladder concept, though philosophically sound, not feasible at the Lexington program.[1]

Unfortunately, the career ladder in the respiratory field is much better developed once the student becomes a Respiratory Therapist. The University of Kentucky offers a Bachelor of Health Science which is a two-plus-two program permitting the student with the associate degree in many health fields to pursue a bachelors's degree without loss of credit.

One program which may possibly affect the student technician is a relatively new Bachelor's degree program in the field of Respiratory Therapy, developed by Indiana

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[1] Phone conversation, Larry Cracium, Director of the Respiratory Therapy Program. April, 1976.

University of Pennsylvania which offers practitioners an opportunity to continue their education. Though the program provides a mechanism for credit transfer and challenging course work, the technician with a certificate normally receives a waiver of only three hours of clinical practice, and past successes on the challenge exams have not been high. Persons completing the Bachelor of Science program are eligible for the Registry Exam, and this certainly is an option available to the student technician. However, credit for course work and expertise previously acquired is granted only on an individual basis through the challenge exam. A copy of the course work (up to 62 hours) subject to challenge is found below. It should be noted, however, that the student from a Certified Respiratory Therapy Technician program is not generally qualified to challenge more than a few hours of course work.

TABLE 4-2
CHALLENGE PROGRAM FOR CERTIFIED RESPIRATORY THERAPY TECHNICIAN

Course	Type of Exam	Credits
Introduction to R.T.	Written	4
Equipment I	Written	4
Nursing Arts	Written	3
Cardiopulmonary Resuscitation	Written/Oral	3
Equipment II	Written	4
Pathology	Written	4
Pharmacology	Written	2
Special Topics in R.T.	Written	4
Ethics and Administration	Written	2
Teaching in Respiratory Therapy	Written	3
Seminar in Respiratory Therapy	Written	3
Facility Design & Function	Written	4
Clinical Practice I	Written/Practical	3
Clinical Practice II	Written/Practical	8
Clinical Practice III	Written/Practical	8
Clinical Practice IV	Written/Practical	3
Clinical Oral	Required to gain Clinical Credits	

Thus, the question of advancing from the terminal C.R.T.T. degree to another level appears to have no easy solution. It is believed that no model can be developed prior to the professional organization's decision on whether or not to encourage linkages from the Certified Technician to the Registered Therapist program. This is the most important link in the career ladder. If students find themselves desiring to proceed to the college level, they have the option, at present, to take C.L.E.P. tests for general course work or to take challenge exams worked out on an individual basis by themselves and the instructor. Though this certainly is not an optimal means for pursuing advanced professional skills, it seems the only alternative, at present, prior to the professional organization's decision on the course of action which they will be taking. At this time, it may be advantageous to review the need for additional certificate and registry programs in Kentucky. The Bureau of Vocational Education may want to investigate means of solidifying linkages with the Lexington Technical Institute and Jefferson Community College program to enhance articulation opportunities for the technician in the future.

Finally, in terms of dissemination, information needs to be provided by the Bureau of Vocational Education (or the Vocational School) on continuing education opportunities available to the technician in order to obtain Registered Therapist status. Even though little, if any, credit is given for course work completed in the technician program, except on an individual basis, students need to be instructed of routes open to them if they desire to advance professionally.

SECTION V MEDICAL ASSISTING PROGRAMS OF KENTUCKY

Chapter 1

INTRODUCTION

MEDICAL ASSISTING PROGRAMS OF KENTUCKY

The medical assisting profession is actually divided into two fields or sub-categories. The Clinical Medical Assistant (CMA) functions primarily in the physician's office as an assistant in patient examinations and other clinical tasks. The Clinical Medical Assistant also receives training to enable him or her to perform simple office laboratory procedures as well as prepare and care for the medical instruments and equipment. Although not a nurse or a medical technologist, the CMA is trained to carry on some of the more simple functions of the two professions.[1] On the other hand, the Administrative Medical Assistant (AMA) is trained in basic secretarial skills which include the use of the typewriter, transcribing equipment, office duplicating machines, and working with the accounting aspect of the medical office practice.[2] The phrase "medical secretary" is sometimes used to refer to the Administrative Medical Assistant.

The educational requirement recommended by the American Association of Medical Assistants, Inc. for the Clinical Medical Assistant is two years of study for an Associate of Arts Degree in a community college or a university. Recommended education for the Administrative Medical Assistant is either two years of college on the associate of arts level or a twelve to eighteen month course in a business college or vocational school. Though licensure is not required by the national agency for either profession, it is becoming more and more looked upon as a measure of ability. Individual certification examinations in both fields are offered annually by the American Association of Medical Assistants, Inc. This national association in collaboration with the Council on Medical Education of the American Medical Association also has accreditation standards which individual programs must meet prior to their being certified. Graduates of AAMA/AMA accredited schools are eligible to take the certification exam immediately, whereas graduates from non-approved programs must have one year of work experience prior to sitting for the exam.

Nature of the Study

As the career ladder concept was being developed, where possible, in other allied health professions, it became apparent that this concept needed to be explored in the medical assisting profession as well. Specifically, two questions of feasibility needed to be discovered: 1) the feasibility in developing a ladder between the non-degree Medical Secretary/Administrative Assistant programs to associate degree programs, and 2) the articulation from the associate degree level to the baccalaureate level in Health Science, Secretarial Science, or a related field.

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[1] *Health Careers in Kentucky: Medical Assisting*, 1974 (no page numbers).

[2] Ibid. (no page numbers).

Methodology

Unlike the other programs discussed in the previous models, the medical assisting curriculum and program development vary significantly from one school to the next in Kentucky. Therefore, rather than taking one specific program and developing a model from which others in the State could duplicate, as was done previously, it was believed more productive to survey the existing programs in the State. In this manner general, rather than specific, conclusions could be drawn on the feasibility of applying the career ladder concept to the medical assisting profession.

The methodology used for an assessment of the medical assisting programs in Kentucky involved sending a questionnaire to directors of each of the thirteen programs in the State and using descriptive information published by Health Careers in Kentucky. Of the sample 61.5 per cent of the questionnaires were returned and of those returned, all but one viewed articulation as desirable. These responses will be discussed further in Chapter 2.[3] It should be noted that although the per cent of questionnaires returned was not as high as would have been desirable, there has been adequate data obtained from other sources to make the assessment of medical assisting programs in Kentucky generally reliable and up-to-date.

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[3] A copy of the questionnaire which was sent can be found as Attachment 1.

GENERAL PROGRAM DESCRIPTION

MEDICAL ASSISTING PROGRAMS OF KENTUCKY

Of the 13 programs for Medical Assisting, five are clinical programs and eight are Administrative Medical Assisting or Medical Secretary programs. A list of schools and pertinent information are found in Table 5-1.

TABLE 5-1
MEDICAL ASSISTING PROGRAMS OF KENTUCKY

Name	Accredited	Name of Program	Degree
Eastern Kentucky University	yes	Clinical	A.A.
Fugazzi Business College	yes	Clinical	Diploma
Jefferson Area Vocational School	no	Medical Secretary	None
Jefferson Community College	no	Administrative	None
Madisonville Health Occupations Annex	no	Medical Secretary	None
Morehead University	no	Clinical[1]	A.A.
Northern University	no	Medical Secretary	*
St. Catharine College	no	Medical Secretary	A.A.
Somerset Community College	no	Administrative	*
Spencerian College	yes	Clinical	None
Sullivan Business College	no	Administrative and Medical Secretary[2]	A.A.
Watterson College	yes	Clinical	None
Western Kentucky University	no	Administrative	A.A.

As indicated by this data, only four of the programs in Kentucky are approved by the American Association of Medical Assistants, Inc.; all of these are clinical programs and two offer associate degrees. None of the administrative programs, on the other hand, are accredited by the national association, although at least three Administrative/Medical Secretary Programs offer associate degrees.

Finally, four of the medical assisting programs are offered at State universities or other accredited four-year institutions. Seven programs are offered at two-year colleges or Business Schools and two of the programs are offered by Vocational Schools.

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[1] Plan to seek accreditation.

[2] Administrative program is 18 months, Medical Secretary is 12-14 months, and students are given a diploma rather than associate degree.

*Information unknown.

Curriculum

Based on the recommendations of the American Association of Medical Assistants, the curriculum for clinical medical assistants includes courses in humanities, social sciences, chemistry, anatomy and physiology, psychology, typing, diagnostic testing, nursing skills, medical office procedures, medical law, ethics and economics. In addition, practical instruction is received in physicians' offices, clinics, and/or other health agencies under the supervision of qualified personnel and a medical assistant instructor. The curriculum for the Administrative Medical Assistant (medical secretary) is usually similar in associate degree programs, although more emphasis is placed on office skills and management. However, in Kentucky the programs vary considerably in length (from 12-24 months) and in course of study.

Employment and Degree Opportunities

Employment opportunities for medical assistants were reported to be good by program directors; however, starting salary opportunities were reported to be low, particularly for the associate degree person.[4] (The assumption inherent in this observation is that with increased education and acquired skills, higher economic incentives should also accrue.) The reason suggested for low salary opportunities is based on the fact that physicians are not yet aware, in many cases, of the skills the medical assisting student has acquired or, in other cases, are not willing to pay more. Based on this reasoning, it is likely that the medical assistant with the associate degree and certification will probably receive about the same salary as a medical assistant with neither a degree or certification, and probably only slightly more than the untrained individual. However, it is equally probable to suspect that as physicians become familiar with the medical assisting profession, they will begin to seek out more qualified and highly trained personnel.

The point to be made is that at present there is minimal economic incentive for the medical assistant to seek career advancement, through certification or an associate degree, within the medical assisting field. Nonetheless, some students are seeking this as an option and graduates from non-degree programs may, in some cases, gain admission into a degree program and receive credit through proficiency exams. Though this is not necessarily seen as "vertical" mobility, it does permit the student to enter a degree program and receive credit for his or her past course work in the medical assisting field.

However, there is more demand for career development not solely within the medical assisting field, but at the entry level (allowing credit for work experience) and the past associate degree level; i.e., towards a Bachelors Degree in a related field. (There is no Bachelors level program in medical assisting offered by the American Association of Medical Assistants.) Students initially entering the medical assisting field may, in some cases, challenge courses based on their work experience. Of the seven programs responding to this question, six programs permitted students to receive credit for past work normally through challenge examinations.

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[4] More lengthy personal interviews were conducted in limited numbers in the course of the data collection in order to get directors' views on the potential value for the development of a mechanism for career laddering.

Secondly, students have satisfactorily completed approved programs (normally with associate degree) may, in some cases, apply their medical assisting training to a Bachelors Degree in Secretarial Science, Health Science, or a related field. However, in many cases, these students must be certified prior to their receipt of credit. Schools mentioned in the questionnaire responses which allow credit towards a Bachelors Degree were Union College, University of Louisville (45 hours), Indiana University (30 hours), Morehead University, and University of Kentucky. Undoubtedly, other universities in the State not mentioned also offer credit for medical assisting coursework.

In summary, it appears that advanced degree opportunities do exist in the State, and for entry level students and medical assistants who desire to pursue degrees, a career ladder can be utilized. The difficulty which may arise, however, is that many of the schools offering programs are not accredited by the Southern Association of Colleges and Schools; thus, direct transfer of credit to accredited universities is often not permitted. Secondly, all of the medical assisting programs are not accredited by the American Association of Medical Assisting. Even though the channels for academic advancement without duplication of coursework appear to exist in Kentucky, the methods by which credit is received vary depending upon the background of the student. This is not to imply that all State universities have developed such career ladders, only that there seemingly is justification for them by several schools in the State.

Chapter 3

EVALUATION

MEDICAL ASSISTING PROGRAMS OF KENTUCKY

Since so few of the programs of Medical Assisting in Kentucky are accredited and the programs vary considerably, it would oversimplify the matter to suggest that a model for articulation could be developed whereby a student could move from one level of education to the next, based solely on the completion of one of the thirteen programs in the State. The student's level of preparation and credentials vary, depending upon where he or she has received training. Therefore, rather than developing a model program as was done in the previous studies of allied health programs in Kentucky, it is recommended that a statement of policy be adopted by the State system of public higher education with reference to a career ladder for all medical assisting programs.[1] It is suggested that this policy statement include the following recommendations:

1. All State vocational, community college and university medical assisting programs should be encouraged to seek accreditation by the American Association of Medical Assisting. Vocational programs needing humanities and/or social science courses in order to receive accreditation should develop linkages with local community colleges. (This would also help in laddering students from non-degree programs into associate degree programs.)

2. Linkages should be developed or refined from the associate degree level to the baccalaureate degree level in all state colleges or universities which provide the option for Bachelors degrees in Health Science, Secretarial Science, or a related field to Certified Medical Assistants.

3. Further study should be made on the feasibility of laddering Certified Medical Assistants into Nursing, Physician Assistant, and/or Medical Record Administration programs offered in Kentucky. This possibility would give the medical assistant important and viable channels of mobility in the technical health area as opposed to existing channels which are education or business oriented. In addition, program development in this area would provide a channel for increasing economic benefits (higher salaries), as well as increasing challenges and responsibilities.

4. The State should work closely with the Kentucky Association of Medical Assisting and the Kentucky Medical Association, promoting health programs which are needed and discouraging those programs which are not needed; thus encouraging proper utilization of health manpower and reduced educational costs for unnecessary programs.

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[1] Such a policy statement would also be appropriate for several of the other health occupations discussed in this project, namely the Certified Laboratory Assistant model and the Radiologic Technology model.

ATTACHMENT 1

QUESTIONNAIRE
for
MEDICAL SECRETARY/MEDICAL ASSISTING PROGRAM
STATE OF KENTUCKY

Please answer briefly the questions which are applicable to your institution and return in the enclosed self-addressed envelope prior to June 28, 1976.

NAME OF INSTITUTION: ________________________________

NAME OF PROGRAM: ________________________________

1. Is the Medical Secretary/Medical Assisting program accredited by the American Association of Medical Assistants?

2. If not, is accreditation being sought?

3. Is the program solely administrative Medical Secretary/Medical Assisting or are students qualified to sit for the A.A.M.A. clinical examination as well?

4. To your knowledge, is college credit presently granted for a student's vocational or business school Medical Secretary/Medical Assisting training? If so, at which institutions and on what basis is credit granted (challenge exams or transfer of credit)?

5. If yours is a college or university program, do the students receive an Associate of Arts Degree? (5a) If so, can they receive a B.A. degree in Secretarial Science or a related program if they so desire?

(5b) Can graduates from non-degree M.A. programs gain admittance to your program and receive credit for their past training?

6. Do you believe that a "career ladder" from technical training to the associate degree level is desirable in the Medical Secretary/Medical Assisting field? Please explain your response.

CE 010 043

Dr. James B. Graham
Superintendent of Public Instruction
Kentucky Department of Education

Mr. Billy R. Howard
Assistant Superintendent for Vocational Education
Kentucky Department of Education

Printed with State and Federal funds as a component of the
Omnibus Dissemination Project